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Hot Blast Applied to the Cupola

Carbon Monoxide Drawn from a Point Below Charging Door Is Burned in a Combustion Chamber, Preheating the Blast

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MR. VIAL, the author of the article, is vice-president and chief engineer of the Griffin Wheel Co., Chicago. The hot blast cupola described was developed by the Griffin Engineering Co., 410 North Michigan Avenue, Chicago, and is covered by United States letters patent No. 1,627,530, issued May 3, 1927. The heating of the blast is said to yield a decided saving of coke, power and labor, with increased control of melting conditions, insuring greater uniformity in the finished product.

THERE has been no fundamental change in the process of remelting iron within shaft furnaces since the earliest invention in pre-historic times. In the 15th and 16th centuries considerable impetus was given to cupola practice when the manufacture of cannon was the principal feature of the cast iron industry.

Present cupola practice dates back to the invention of the steam engine in the latter part of the 18th century. The first application of steam for industrial purposes was to furnish power for blowing cupolas and blast furnaces and also to pump water from coal mines, which were flooded on account of the inability to make any headway with hand pumping. This combination of making available an inexhaustible supply of fuel for metallurgical purposes and for the generation of steam started the factory system of industry, which gave England her industrial supremacy for more than a century.

The cupola represents the most economical furnace for melting iron, as shown by the following table taken from Richards' "Metallurgical Calculations":

Type of Furnace	Per Cent of Thermal Efficiency
Crucible	2 to 3
Reverberatory	10 to 15
Regenerative open-hearth	20 to 30
Cupola	30 to 50
Steam boiler and hot blast stove.....	50 to 75

Because of its cheapness of construction and relatively high thermal efficiency as compared with the expensive regenerative open-hearth process used in the steel industry, the cupola has received very little attention from the standpoint of economy in fuel, for it already stands at the head of the list in this respect.

Little Done in Past to Conserve Waste Heat from Cupola

Through all the ages waste heat from the cupola has been observed, but on account of the economy in the cupola compared with all other types of furnaces, little has been done to curtail the known waste. Attempts at economy in fuel consumption have been made by sug-

gesting very small or very deep cupolas; tuyeres have been made in every conceivable manner and shape, in single rows and double rows with all kinds of claims for economy, only to find that they all operate about alike, with no special difference in economy of fuel. Unsuccessful attempts have been made to preheat the blast.

Notwithstanding the failures in prior attempts and contrary to the principles laid down in standard books on cupola practice, the Griffin Wheel Co., Chicago, determined to develop a successful method of preheating the blast. The experiments were conducted on a commercial basis in a cupola 74 in. in inside diameter, and after many delays and expensive alterations a successful combination was made of the old idea of preheating the blast and the old idea of charging the cupola with alternate layers of coke and iron, producing a new result, namely, the commercially successful preheating of the blast, which factor, in connection with successful demonstration in several cupolas on a production basis, was sufficient to obtain United States and foreign patents.

Blast Preheated by Burning Gas Drawn from an Upper Wind Box

The method of applying the process is shown in Fig. 1, in which a standard cupola is used in the ordinary manner with an upper wind box added below the charging door. Through this second wind box a portion of the gases of combustion is drawn from the cupola, passing to a combustion chamber where the inflammable carbon monoxide gas is burned, developing an increased amount of heat which passes through the tubes of a preheater and up through an exhaust fan. The air for the cupola blast enters the preheater among the tubes which are heated with the cupola gas and passes on to the cupola through the ordinary wind box.

Fig. 2 shows a cupola with a blast heater of sufficient size to heat the air of combustion for a melting capacity of 20 tons per hour. The hot blast pipe is

shown leading from the blast heater to the cupola. The blast pipe passing through the wall at the left is an emergency connection, to be used in case it is necessary to operate the cupola with a cold blast. Adjoining the heater is a flue which carries the gases of combustion from the upper wind box of the cupola to the lower compartment of the blast heater, shown in section in Fig. 1. The small pipe leading from the hot blast pipe to the flue is a by-pass to supply heated air for the combustion of the carbon monoxide gas from the cupola. The circulation of the gases and the construction of the heater is shown in Fig. 1.

Fig. 3 is a view of the blast pipe leaving the blower and connecting with the heater. A diaphragm is placed in the flanged joint to the right which compels a flow of air to travel through the pipe at the left through the wall and into the blast heater. In case it becomes necessary to operate the cupola with cold blast, the diaphragm is removed from the flanged joint at the right and placed into the flanged joint at the left. In other words, the cupola may be changed from the hot blast to a cold blast and vice versa, at pleasure.

Fig. 4 shows the exhaust fan on a platform in the charging room. The gases of combustion are drawn from the heater through the pipes as shown. The two pipes leading downward connect with the upper part of the blast heater, by means of which the gases are drawn uniformly from each end. The cupola is shown at the extreme left.

Hot Blast Cupola on Production Basis for Two Years

The application of the hot blast to the Griffin cupolas has been in successful operation on a regular production basis for a period of two years, melting approximately 200,000 tons of iron. The results obtained from a hot blast cupola 74 in. in inside diameter melting 125 tons per day and from an ordinary cupola operating at the plant under the same conditions are shown in the following comparison:

COMPARISON OF ORDINARY CUPOLA PRACTICE WITH GRIFFIN HOT BLAST CUPOLA PRACTICE

	Cold Blast	Hot Blast
Lb. bed coke per ton melted.....	37	32
Lb. coke regular charge per ton melted.....	225	163
Total lb. coke per ton melted.....	262	195
Bed charge coke, in lb., minus one regular charge	5,500	4,700
Coke, regular charge, in lb.	1,125	1,000
Iron charges, in lb.	10,000	12,500
Temperature of gases, in deg. Fahr., escaping from cupola:		
At the lining, average.....	856	580
At center of cupola.....	562	310

Comparison of Gas Analyses from Cold Blast and Hot Blast Cupolas of the Same Diameter and Melting at the Same Rate per Hour, Using the Respective Amounts of Coke Shown Above

Cold Blast Cupola					Hot Blast Cupola				
Time	% CO ₂	% O ₂	% CO	% N	Time	% CO ₂	% O ₂	% CO	% N
9:00 a. m.	9.8	1.4	16.6	72.2	9:00 a. m.	12.6	0.4	12.4	74.6
9:30 a. m.	10.2	0.4	16.8	72.6	9:45 a. m.	15.0	0.6	9.4	75.0
10:05 a. m.	10.0	0.4	15.6	74.0	10:15 a. m.	12.0	0.8	10.4	76.8
10:50 a. m.	10.4	0.2	17.0	72.4	10:45 a. m.	15.0	0.4	9.8	74.8
11:15 a. m.	10.8	0.2	15.4	73.6	12:40 p. m.	14.2	0.4	10.2	75.2
11:45 a. m.	10.8	0.2	16.0	73.0	1:10 p. m.	15.6	0.6	8.4	75.4
1:00 p. m.	12.6	0.2	13.0	74.2					
1:30 p. m.	12.0	0.2	14.0	73.4	Average	14.1	0.5	10.1	75.3
Average	10.8	0.4	15.6	73.2					

The above results indicate clearly that combustion in the hot blast cupola is more complete than in the cold blast. The averages indicate that about 11 per cent of carbon dioxide is formed for the cold blast and 14 per cent for the hot blast. It is the more complete combustion in the hot blast that is a large factor in fuel economy.

In approaching the subject of stopping some of the waste in fuel consumption, it is essential that the

amount of waste heat and the form in which it exists should be known. There are certain heat losses which cannot be avoided, such as the heat required for the formation of slag, for the disintegration of limestone, for the dissociation of moisture and for radiation, which includes the heat taken up by the cupola lining, all of which constitutes a fairly constant amount, which does not give promise of any great possibility in saving. The three important and obvious forms of heat loss which are recoverable are the sensible heat of the gases as they leave the cupola, the loss from incomplete combustion and the potential heat in the combustible gases as they emerge from the charges at the charging door. It is important that the amount of these losses should be fairly well understood before any scheme for their partial elimination can be considered.

With this in mind, it is necessary to prepare a heat balance, not for any absolute theoretical consideration of the various elements in the analysis, but merely as a practical working basis for foundry practice. The constants used are as shown at bottom of page.

Those relationships make it possible to calculate all the quantities which enter into the various stages of combustion of a definite amount of carbon, for all the carbon in the fuel must be accounted for in the gases of combustion, either as carbon dioxide or carbon monoxide.

Comparison of Temperatures Developed in Two Extremes of Combustion

Carbon dioxide is a non-combustible gas representing perfect combustion and develops a maximum amount of heat, also a maximum flame temperature for direct combustion of carbon. The amount of heat is represented by 14,560 B.t.u. for each pound of carbon burned, and the temperature developed is approximately 3700 deg. Fahr.

Carbon monoxide represents the first state of combustion, developing a minimum amount of heat and a minimum temperature, and is a highly combustible gas. The amount of heat developed in this reaction is 4360 B.t.u. for each pound of carbon consumed, developing a flame temperature of 2340 deg. Fahr.

In each case it is assumed that the theoretical amount of air has been used; any excess of air will reduce the flame temperature in proportion to the excess of air to be heated.

When the combustible carbon monoxide is burned to carbon dioxide, the amount of heat developed by each pound of carbon is 10,200 B.t.u., developing a flame temperature of 3800 deg. Fahr.

The quantity of air required and the composition of the resultant gases by volume and weight for the two extremes of combustion are shown in the following table:

For 1 Lb. of Carbon Plus 5 Per Cent Excess Air for Oxidation of Silicon, Manganese, Slag, Etc.

	Carbon Dioxide	Carbon Monoxide	Carbon Monoxide to Carbon Dioxide
Requirements:			
Air, lb.	12.1	6.1	6.0
Oxygen, lb.	2.8	1.4	1.4
Nitrogen, lb.	9.3	4.7	4.6
Air, cu. ft.	150.6	75.3	75.3
Oxygen, cu. ft.	31.6	15.8	15.8
Nitrogen, cu. ft.	119.0	59.5	59.5
Results:			
Carbon dioxide, lb.	3.66	...	3.66
Carbon monoxide, lb. ....	...	2.33	...
Nitrogen, lb.	9.35	4.67	9.35
Total gases	13.01	7.00	13.01
Carbon dioxide, cu. ft.	30.00	...	30.00
Carbon monoxide, cu. ft. ....	...	30.00	...
Nitrogen, cu. ft.	119.0	59.50	119.00
Total	149.0	89.5	149.0
Per cent of carbon dioxide..	20.0	...	20.0
Per cent of carbon monoxide	...	35.5	...
Temperatures, deg. Fahr. ..	3,700	2,340	3,800
B.t.u.	14,560	4,360	10,200

Substance	Specific Gravity	Weight in Lb. per Cu. Ft.	Weight in 1 Cu. Ft. of Air	Per Cent of Air by Weight	Per Cent of Air by Volume	Atomic Weights
Oxygen	1.099	0.0887	0.0186	23.05	20.97	Carbon 12
Nitrogen	0.967	0.0781	0.0610	75.59	78.11	Nitrogen 14
Argon and carbon dioxide	1.470	0.1186	0.0011	1.36	0.92	Oxygen 16
Air	1.000	0.0807	0.0807	100.00	100.00	Argon 40
Carbon dioxide	1.530	0.1222				Iron 56
Carbon monoxide	0.967	0.0778				Sulphur 32
						Manganese 55
						Calcium 40
						Silicon 28
						Phosphorus 31

The foregoing discussion relative to the formation of carbon dioxide and carbon monoxide gases shows the combustion that takes place for the two extreme limits of combustion. When combustion is perfect the maximum amount of heat is produced, in which case carbon dioxide forms 20 per cent of the gases of combustion with no carbon monoxide. At the opposite extreme, which produces the minimum amount of heat, carbon monoxide forms 33.5 per cent of the gases of combustion, with no carbon dioxide. Conditions within the cupola will always be somewhere between these extremes.

The analysis of the gases as they emerge from the cupola reveals a great variety of information. It shows the amount of heat that is being developed from the fuel, the temperature of the combustion zone, the amount of oxygen that is being used to oxidize the elements such as silicon, manganese, iron, etc., and, by reference to a heat balance table, shows the number of pounds of iron that are being melted for each pound

of air and imperfect means of bringing each atom of oxygen in contact with each atom of carbon. The temperatures will drop approximately in proportion to the impurities in the coke as compared with pure carbon.

The reports on cupola gas analysis by writers on cupola practice are very meager, notwithstanding the fact that gas analysis is fundamental to a correct understanding of the quality of the product as well as of fuel economy.

Heat Lost in Cold Blast Cupola Because of Large Amount of Carbon Monoxide Produced

The wide variation in results at different times in the same cupola and in different cupolas depends primarily upon the uniformity with which the fuel is placed in the cupola and the rate at which the air is introduced into the combustion zone. The number of charges in the cupola and the heat gradient of the gases while preheating the charges may have a decided

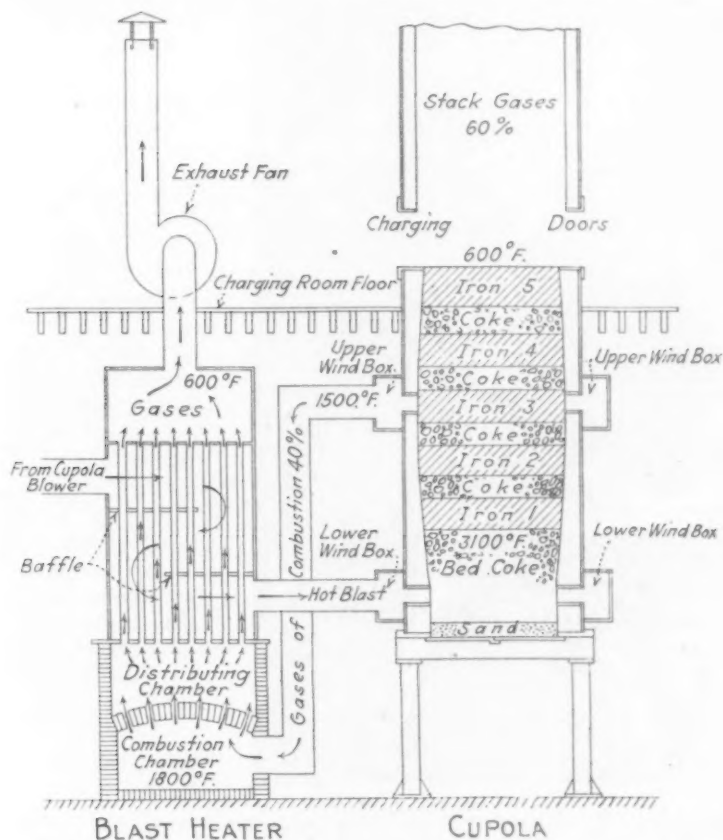


FIG. 1. A Portion of the Gases of Combustion in the Cupola Is Drawn from the Upper Wind Box to the Combustion Chamber of the Blast Heater. Here the carbon monoxide in the gases is burned, developing heat which passes through tubes in the blast heater to an exhaust fan. The air for the cupola blast is heated by contact with the blast heater tubes and enters the cupola through the ordinary wind box

of coke. If closely followed, the gas analysis will indicate the best rate of flow of air through the combustion zone to produce the greatest amount of heat, but because the gases are invisible, their relationship is seldom sought through gas analysis, which is the simplest of all chemical determinations.

From Table I the following observations are made:

One per cent increase of carbon dioxide in the gases of combustion necessitates a decrease of 1.67 per cent of carbon monoxide; hence the amount of heat developed from the combustion of 1 lb. of carbon, when the gas analysis is known, is easily calculated from the following relationship:

- One per cent of carbon dioxide develops 728 B.t.u.
- One per cent of carbon monoxide develops 130 B.t.u.
- One per cent increase in carbon dioxide represents an increase of 510 B.t.u.
- One per cent of carbon dioxide is accompanied by approximately 4 per cent of nitrogen.
- One per cent of carbon monoxide is accompanied by approximately 2 per cent of nitrogen.
- Each per cent of carbon dioxide represents a flame temperature of 185 deg. Fahr.
- Each per cent of carbon monoxide represents a flame temperature of 70 deg. Fahr.
- An increase of 1 per cent of carbon dioxide therefore indicates a net increase of 68 deg. in flame temperature.

These figures are the theoretical results from burning pure carbon in the cupola. The temperatures are never reached in a cupola on account of a slight excess

effect on the ultimate combustion by reducing the carbon dioxide originally formed into carbon monoxide as the gases of combustion pass through layers of incandescent coke, thereby absorbing 10,200 B.t.u. for each pound of carbon represented in the reduction.

In ordinary cupola practice there is an excess of coke on the first charge, resulting in a low stage of combustion for the first few minutes after the cupola is in blast in which only 6 per cent or 7 per cent of carbon dioxide is formed and 22 per cent of carbon monoxide. As the excess coke is burned away the percentage of carbon dioxide gradually rises until a balance is reached at 10 to 12 per cent, with 15 to 18 per cent carbon monoxide. This refers to the larger cupola melting from 15 to 20 tons per hour and continuing in blast for 6 to 8 hr. per day. It is necessary to have an excess of carbon monoxide in the gases of combustion to prevent oxidation of the metal, which is the most active agent in lowering the quality of the product.

In a paper delivered before the American Foundrymen's Association by W. H. Cameron in 1904 the percentage of carbon dioxide in the gas from a 44-in. cupola is given as 11 to 13 per cent, and from a 66-in. cupola, 10½ to 12½ per cent.

Bradley Stoughton in his work on the "Metallurgy

of Iron and Steel" gives the following average analysis for several different cases:

Time Elapsed	No. of Samples	Average Percentage of	
		Carbon Dioxide	Carbon Monoxide
1 to 4 hr.....	4	8.3	19.4
1 to 3 hr.....	3	7.3	19.0
3 hr.....	1	5.4	14.3
3 hr. 10 min.....	1	10.3	11.7
1 hr. 40 min. to 4 hr. 43 min.....	4	8.1	18.2
1 hr. 53 min. to 4 hr. 45 min.....	4	8.1	18.0
Another cupola			
1 hr. 30 min. to 3 hr. 20 min.....	3	12.6	11.0
Average.....	..	8.6	15.9

From the above discussion and from long experience in melting a large tonnage of iron in numerous cupolas it may be considered as established that the character of combustion in ordinary cupola practice is represented by 9 to 11 per cent carbon dioxide and 18.4 to 15.1 per

In the Griffin hot blast cupola approximately 40 per cent of the gases of combustion are withdrawn from the cupola below the charging door, leaving 60 per cent to pass up through the remaining charges, and on account of the smaller volume the velocity is checked, giving greater time for the transfer of heat from the gases of combustion to the charges of coke and iron through which they pass. For that reason the temperature of the 60 per cent of gases which emerges from the cupola in the ordinary manner is reduced to 600 deg. In fact, it is not at all difficult to make the conditions such that the temperatures are reduced to 200 or 300 deg.

Unavoidable Heat Losses in Cupola Operation

In establishing a heat balance it is necessary to consider the heat losses within the cupola which arise from radiation, formation of slag, liberating carbon dioxide from limestone, dissociating moisture in the blast and the coke, the sensible heat contained in the



FIG. 2. • The Blast Heater Shown Is of Sufficient Size to Heat the Blast for a Melting Capacity of 20 Tons per Hour. The hot blast pipe is shown connecting the blast heater with the cupola. The pipe connection through the wall is an emergency passage, to be used in case it is necessary to operate the cupola with a cold blast

cent of carbon monoxide. This range of analyses furnishes the data for a starting point in calculating the heat balance for cold blast cupola practice. There are other sources of heat than those arising from the combustion of carbon, such as the oxidation of silicon, manganese, sulphur, iron, etc., which require oxygen for the chemical reaction which is represented by excess air above the requirements for the combustion of coke. This accounts for the excess nitrogen present in the gases of combustion. The heat from these sources is not taken into consideration when discussing heat balances.

Economy from Use of Hot Blast Cupolas Is Due to More Perfect Combustion

If we assume that the air of combustion is delivered to the combustion zone at 600 deg. Fahr., there are two additional factors which enter into consideration of the heat balance:

1. A definite amount of sensible heat is carried to the combustion zone which is added to the quantity of heat developed by combustion.
2. In addition to the sensible heat carried to the combustion zone, the combustion is intensified, resulting in a larger percentage of carbon dioxide and a smaller percentage of incomplete combustion represented by carbon monoxide.

The economy in the use of the hot blast arises largely from the more perfect combustion.

The temperature of the gases after passing two charges of iron will be reduced to about 1500 deg. Fahr.

gases as they leave the cupola, incomplete combustion, etc.

Radiation

Radiation represents the heat absorbed by the brick lining and the heat which passes through the shell of the cupola, amounting to from 6 per cent to 10 per cent of the heat generated by the combustion of carbon.

Slag

The amount of slag for each pound of carbon will vary slightly according to the number of pounds of iron melted for each pound of coke consumed. It may be assumed in ordinary practice that about one-third of a pound of slag is formed for each pound of coke consumed. One pound of slag requires approximately 900 B.t.u. for its formation.

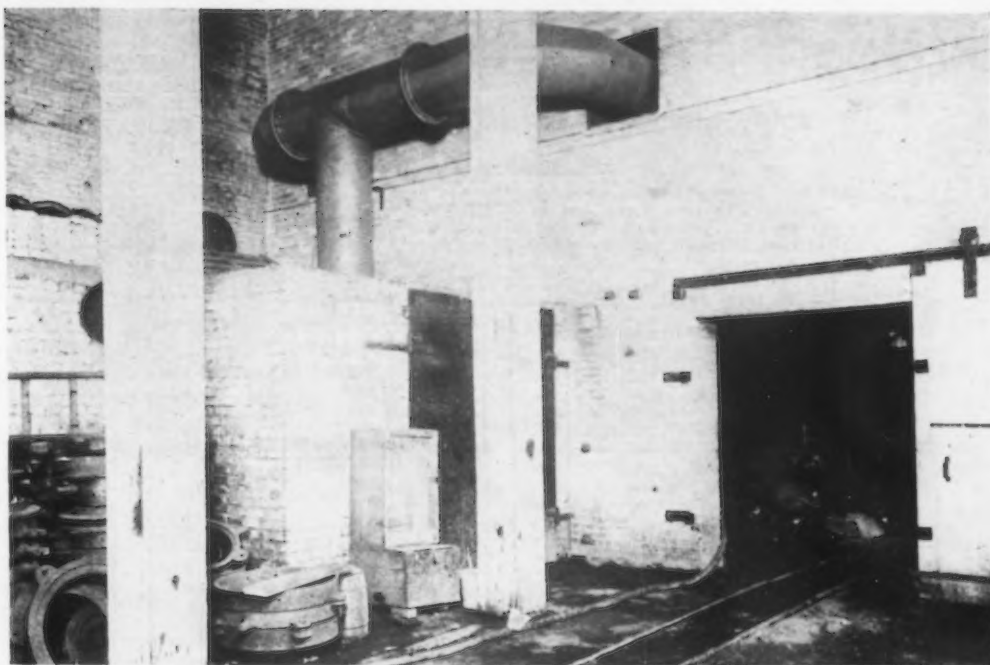
Liberating Carbon Dioxide

It is assumed that the amount of limestone required for each pound of coke will contain from 2/5 to 2/3 lb. of carbon dioxide. To liberate 1 lb. of carbon dioxide from limestone requires about 840 B.t.u. On this basis the approximate amount of heat required for breaking up limestone and liberating the carbon dioxide can be calculated and placed among the losses in the heat balance.

Moisture

The heat loss on account of moisture in the blast is an uncertain quantity and varies through a wide range. On hot days with high humidity the loss is an impor-

FIG. 3. The Blast Pipe Leaving the Blower Is Arranged so that by Removing a Diaphragm from the Flanged Joint at the Right and Placing It in the Flanged Joint at the Left the Cupola May Be Operated on Cold Blast Instead of Hot Blast



tant factor in cupola operation, whereas in the winter months, with low humidity, this factor is negligible.

The total of these four items amounts to from 1600 to 2200 B.t.u. for each pound of coke consumed.

Waste Gases

The loss represented by the sensible heat in the gases as they emerge at the charging door depends upon their temperature, which varies over a wide range at different cupolas and at different locations in the same cupola. The gases are invariably of higher temperature next to the lining than at the center of the charge. The difference is usually 50 per cent or more of the temperature at the center. In case the temperature at the lining is 1200 deg. Fahr., we may expect the temperature at the center of the charge to be 900 deg., whereas if the temperature at the lining is 900 deg., the temperature at the center will be 600 deg., and if the temperature at the lining is as low as 600 deg., the temperature at the center will be about 400 deg.

For the purpose of our analyses of heat losses, we

have taken the temperature at 800 deg. above the atmospheric temperature as representing ordinary practice in cold blast cupolas. In the hot blast cupola the temperature of the escaping gases is much less. For the purpose of preparing a heat balance we have assumed the temperature to be 600 deg. Also in the case of the hot blast cupola it is necessary to consider the sensible heat withdrawn below the charging door, the temperature of the escaping gases from the exhaust fan and the amount of sensible heat which enters the cupola with the air for combustion.

Heat Available for Melting After Making Deductions

After making these deductions from the heat generated we have the remainder available for melting iron, and for easy calculation we have used 500 B.t.u. as the heat necessary to raise the temperature of iron from the cold stock to the melting point, supplying the latent heat of fusion, and to raise the temperature of the molten iron to 2600 or 2700 deg. Fahr.

It is assumed that the carbon content of the coke

FIG. 4. On a Platform (to the Left) in the Charging Room Is an Exhaust Fan which Draws the Gases of Combustion from the Blast Heater through the Pipes Shown. The cupola is shown at the extreme left



Heat Balances in Cold Blast and Hot Blast Cupolas

Required for Combustion: 1 Lb. Coke	Cold Blast, Stages of Combustion			Griffin Hot Blast, Stages of Combustion		
	9% CO ₂	10% CO ₂	11% CO ₂	12% CO ₂	13% CO ₂	14% CO ₂
Cu. ft. air.....	95.0	98.2	101.5	104.8	108.1	111.3
Lb. air.....	7.6	7.9	8.2	8.4	8.7	8.9
Gases of Combustion:						
Per cent CO ₂ by volume—cu. ft..	9.0	10.0	11.0	12.0	13.0	14.0
Per cent CO by volume.....	18.4	16.8	15.1	13.4	11.8	10.1
Per cent nitrogen, etc., by volume	72.6	73.2	73.9	74.6	75.2	75.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Cu. ft. total gases.....	101.2	103.8	106.4	109.0	111.5	114.2
Lb. total gases.....	8.4	8.7	9.0	9.2	9.5	9.7
Temp., in deg. Fahr., leaving cupola	800	800	800	600	600	600
Temp., in deg. Fahr., at combustion zone.....	2,540	2,600	2,660	2,920	2,980	3,120
B.t.u. from coke (theor.).....	7,786	8,230	8,674	9,117	9,561	10,005
Assume 95 per cent efficiency....	7,398	7,819	8,241	8,662	9,084	9,505
B.t.u. in hot blast at 600 deg....	.....	.....	.....	1,263	1,302	1,341
Total heat in cupola (B.t.u.)....	7,398	7,819	8,241	9,925	10,386	10,846
Heat Losses:						
Gases leaving cupola (B.t.u.)....	1,684	1,736	1,789	830	854	877
Gases to recuperator—1500 deg. (B.t.u.) .....	.....	.....	.....	1,383	1,422	1,461
Other losses (B.t.u.)	1,791	1,879	1,967	2,056	2,144	2,232
Total losses (B.t.u.).....	3,475	3,615	3,756	4,269	4,420	4,570
Available for melting (B.t.u.)....	3,923	4,204	4,485	5,656	5,966	6,276
Lb. iron melted (500 B.t.u. per lb.)	7.85	8.41	8.97	11.31	11.93	12.55
Lb. coke per ton melted.....	255	237	223	177	168	159
Add bed coke in lb. (variable)....	35	35	35	35	35	35
Total lb. coke per ton iron melted	290	272	258	212	203	194
Cu. ft. air per lb. melted.....	12.1	11.8	11.3	9.2	9.1	8.9
Cu. ft. air per ton melted.....	24,300	23,500	22,700	18,400	18,200	17,800
Lb. air per ton melted.....	1,944	1,880	1,816	1,472	1,456	1,424
Recoverable Losses:						
Sensible heat of gases (B.t.u.)..	1,684	1,736	1,789	830	854	877
Potential heat in CO (B.t.u.)....	4,636	4,215	3,793	3,372	2,950	2,484
Total (B.t.u.).....	6,320	5,951	5,582	4,202	3,804	3,361
Per cent waste heat compared with heat used for melting..	161.2	141.6	124.5	75.0	64.0	54.0
Thermal efficiency (per cent).....	31.0	33.2	35.4	44.5	47.0	49.5

is 85 per cent and that the difference between theoretical consideration and practical performance is 5 per cent; in other words, we have assumed 95 per cent efficiency in combustion. Applying these figures to a heat balance and tabulating them for the various stages of combustion within the range of cupola practice, each stage being represented by a variation of 1 per cent of carbon dioxide gas in the gases of combustion as they emerge at the charging door, places the information in a form so that a mere inspection shows the amount of iron melted for each pound of coke for any given condition of combustion.

The accompanying table of heat balances indicates

the following saving in pounds of coke per ton melted:

Pounds of Coke Required to Melt 1 Ton of Iron Under Various Conditions of Combustion			
Cold blast.	9% CO ₂ , 255 lb.	10% CO ₂ , 237 lb.	11% CO ₂ , 223 lb.
Hot blast..	12% CO ₂ , 177 lb.	13% CO ₂ , 168 lb.	14% CO ₂ , 159 lb.
Saving of coke per ton melted }	78 lb.	69 lb.	64 lb.

These savings are entirely within the possibilities of the hot blast operation. The percentage of saving will depend largely upon the character of the material melted, the quality of coke used, the character of the finished product and the degree of perfection attained in the present cupola.

SEPTEMBER SHEET SALES

Nearly 46 Per Cent Ahead of August and Exceeded Shipments

September sales of independent sheet steel manufacturers made an even better showing in the final report than was indicated in the preliminary estimate issued Oct. 5. Actual sales were 258,427 tons, or 8427 in excess of the preliminary figures, and compare with 177,647 tons in August. Sales exceeded shipments by practically 28,000 tons, and unfilled orders at the end of the month were 37,455 tons more than at the end of August. Production ran almost 10,000 tons less than shipments, but included in the shipments for the month were more than 12,000 tons of stock that was on hand and awaiting shipping instructions at the end of August. The total of that item on Aug. 31 was 114,762 tons; at the end of September it was 102,554 tons.

With the September report of the National Association of Sheet and Tin Plate Manufacturers, a new basis of calculation of capacity tonnages is adopted. Hitherto, the premise has been 7.65 net tons per turn of sheet mills and 22.635 net tons per turn of jobbing mills, based upon 16 turns per week and 50 weeks per year. The new basis puts the average production of sheet mills per turn at 8.67 tons and of jobbing mills at 22.56 tons. The old basis found its origin in a study

made during the period of governmental control of production and distribution in the war period. The new code represents a study covering production over the past 3½ years and recognizes the shifting from steam to electrically driven mills, other mill betterments and the increased efficiency of man power. Its adoption means that, in a comparison with former months, the percentages of the September report average approximately 11 per cent lower than on the old basis of reckoning.

The figures for September with comparisons follow:

	1927—			1926
	*Sept.	†Aug.	‡July	§Sept.
Total No. of mills.....	719	719	719	710
Capacity per month, tons.....	485,950	457,315	407,200	432,650
Percentage reporting	72.6	72.6	72.6	73.8
Sales, tons.....	258,427	177,647	230,715	448,147
Production, tons.....	220,919	266,645	237,243	307,459
Shipments, tons.....	230,443	266,713	252,034	302,198
Unfilled orders, tons.....	350,117	312,662	353,413	731,977
Unshipped orders, tons....	102,554	114,762	109,836	99,911
Unsold stocks, tons.....	53,311	54,553	44,538	34,511
Percentages of Capacity				
Sales	73.3	53.5	78.1	140.3
Production	62.6	80.3	80.2	96.2
Shipments	65.3	80.3	85.3	94.3
Unfilled orders	99.3	94.2	119.6	229.2
Unshipped orders.....	29.1	34.6	37.2	31.3
Unsold stocks.....	15.1	16.4	15.1	10.8

*Basis for calculation of capacity tonnages: Sheet mills, 8.67 net tons per turn; jobbing mills, 22.56 net tons per turn. Sixteen turns per week for 50 weeks.

†Sheet mills calculated at 7.65 net tons per turn; jobbing mills 22.635 net tons per turn.

Fuels—Past, Present and Prospective

Changes Traced Over a Century—Smoke Production One Backward Step—Gaseous Fuels Favored

BY S. W. PARR*

DISCOVERY of coal on this continent is credited to Father Hennepin, near the Illinois River in LaSalle County, Illinois. The record of commercial shipments from Jackson County, Illinois, by barge to New Orleans shows such activity to have been inaugurated in 1810. That event, so far as the records go, does not seem to have been preceded by any earlier activities from the coal fields of the eastern States.

One of the earliest accounts, giving a glimpse of the fuel situation 100 years ago, is an article by Marcus Bull, published as a brochure in 1826 by the American Philosophical Society, Philadelphia. He compiled an estimate of the quantity and type of fuels used by Philadelphia per year, and the values he obtained were doubtless representative for the United States. Out of the total consumption of fuel, 80 per cent was estimated to be wood, 3 per cent was charcoal and a little over 14 per cent was anthracite. In a populous center like Philadelphia the smoke-producing bituminous fuel was less than 2 per cent.

Use of fuel was confined almost entirely to supplying household needs for cooking and heating. The use of anthracite was just beginning to be advocated as a substitute for wood in the household. Only 10 years before, Fulton had made his trip on the Hudson. It was still to be 10 years before a trans-oceanic voyage was made by steam. The first locomotive in America had not yet been fired up; when it was, three years later, the fuel was wood.

Changes within the Century

Estimates of Marcus Bull in 1826, of 11,000,000 tons of fuel a year for the entire United States, represent about one ton per capita. An estimate of the coal output for 1821, from other sources of information was 1322 tons, all anthracite. From this status we have advanced to 600,000,000 tons, about 5 tons per capita. About one-sixth of this tonnage is anthracite and the remainder is bituminous coal. The estimated value at the mines is \$1¼ billions, and to the consumer, with shipping charges added, the annual cost would exceed \$5 billions.

Types of fuel have so changed that, instead of non-smoke-producing fuels of various sorts aggregating 98 per cent of the total, as in 1826, the smokeless type has practically disappeared. We are now consuming various fuels over 80 per cent of which are smoke making.

Advance in efficiencies has been commensurate with the enormous expansion in volume. This feature is to be credited to the engineer, whose strides can readily be noted in more scientific boiler settings, improved stokers, turbine engines, pulverized coal, superheaters, economizers, and high boiler pressures. One might think that the engineer had about reached his limit, but more likely he has just made a good beginning.

Pall of Smoke Not All Industrial

An additional characteristic which has left its mark in more ways than one is the smoke evil. This has seemed an inevitable result of the increase in the use of bituminous coal. And why should there be smoke?

The ignition temperature of marsh gas is between 1200 and 1300 deg. Fahr., a bright cherry red. Ethylene requires above 600 deg. Fahr. for ignition. These

are some of the more common gaseous products evolved from bituminous coal when heated. If, in burning coal, they are disengaged with an insufficient oxygen supply to complete their combustion, or if while burning they strike a sufficiently cooler surface to lower their temperature below the ignition point, their function is mainly altered from heat producers to smoke producers.

In the steam generating plant these factors may be controlled in an effective manner by slow and evenly distributed additions of coal, or by special setting of the boiler—hence the modern mechanical stoker and the elevated or elongated boiler settings to provide both space and time for the combustion of gases before cold surfaces are encountered.

But the case with the average household or apartment heating unit is entirely different. Here the high temperatures do not prevail. Mechanical stokers and spacious combustion spaces are absent. Moreover, the man of the house or the janitor has other duties to perform. Hence he fills the combustion chamber to the limit and sets the dampers for a prolonged period of automatic control. During the major part of this period the so-called "heater" is simply a device for stewing off tars and vapors of inconceivable variety as to composition, odor and filth, for the effective work of polluting the atmosphere.

Some of the hopeful features of the case are the following:

1—Public intelligence is growing. This fuel conference is sufficient confirmation of that fact.

2—Scientific and investigational intelligence has made wonderful advance in this line in recent years; one might almost say, in recent months. This conference will prove an excellent medium for bringing valuable data forward and will promote further study and specific application.

3—Fuel research is being promoted by both governmental and private agencies today as never before. This conference should serve as a clearing house for results so obtained, with a view to their scrutiny and discussion and sifting from the standpoint of practicability and the general welfare.

4—Our knowledge of the constitution of coal has developed at a marked pace in the last few years. Knowledge of the underlying principles of coal carbonization have kept abreast of the fundamental data thus developed relating to the constitution of this complex material. Theoretical conditions have been established regarding the possibility of processing bituminous coal under such conditions as will result in (1) a solid smokeless fuel admirably suited to domestic use, (2) a gas of high quality and in sufficient volume to make it attractive to the gas maker, and (3) a tar of considerable volume and established rating in the current markets using such material.

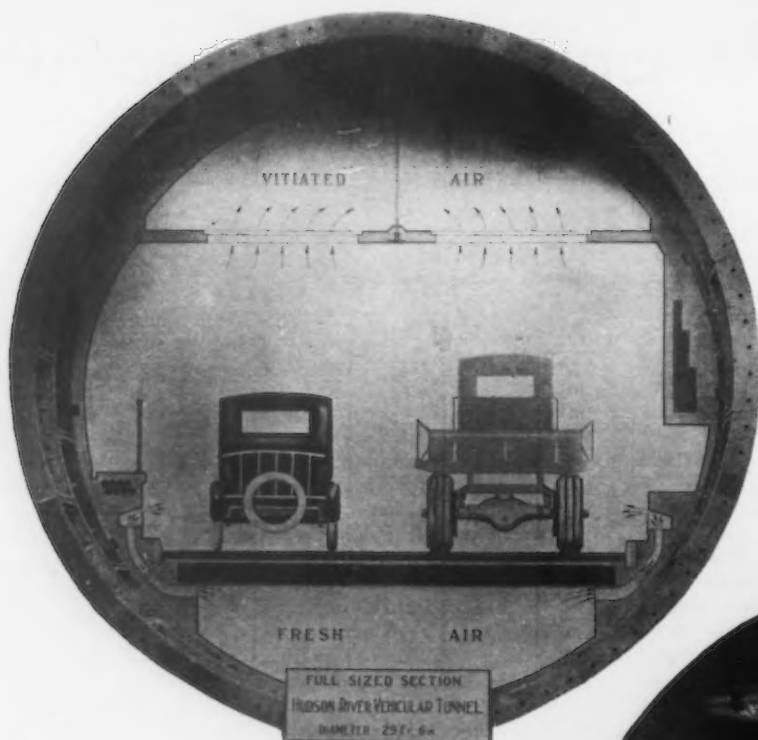
The ideal fuel as a heating medium is gas. Its smokeless combustion, high efficiency, cleanliness and convenience give it a status unapproached by any other type of fuel. When it reaches the stage of volume-production to an extent where costs can be materially reduced, the extension of its use will be greater than can be remotely realized now.

We shall welcome and encourage every agency and process calculated to promote that end. The low or even the high-temperature carbonization of coal, complete gasification, improvements in the water-gas reaction, the increased demand from industrial heating, and other developments such as the Brunler engine or other applications of underwater combustion for power or evaporative purpose—these, and many other possibilities now emerging, furnish a most encouraging outlook whose reduction to every-day industrial and living conditions we shall certainly see consummated in the next few years.

*Professor of applied chemistry, University of Illinois, Urbana. This is an abstract of the opening address at the first "national fuels meeting," sponsored by the American Society of Mechanical Engineers and held at St. Louis, Oct. 10 to 13.

Hudson River

TWO cast iron tubes form a large part of the 9250-ft. double-tunnel connection between Canal Street, N. Y., and Jersey City, to be formally opened to traffic next month. The tunneling was started from four shafts, two sunk on each side of the Hudson River, each shaft 43 x 47 ft. in plan and 70 ft. high, made with double steel plate walls about 6 ft. apart. The accompanying pictures help to tell the tunneling part of the story of an enterprise which called for the expenditure of some \$48,000,000.



THE tunnel from Canal Street, New York, to Jersey City, includes two parallel tubes of cast iron, 65 ft. apart, dipping 100 ft. below the river level. The cast iron shell consists of rings 29½ ft. in diameter and 30 in. long each, composed, in addition to a key piece, of 14 3000-lb. segments.



EACH tunnel was driven by two 300-ton shields, 30 ft. in diameter and 19 ft. long, started from opposite sides of the river. The view at the right shows the cutting faces of two shields the day before junction was made under the center of the river. Each was pressed forward by means of 30 200-ton jacks reacting against the completed portion of the tunnel lining.



THE flanges of the segments were connected by special 1½-in. steel bolts put under 25,000 lb. per sq. in. initial tension by 4-ft. two-man ratchet wrenches. Joints were made with red lead grommets and lead wire caulking with pneumatic tools.



Vehicular Tunnel at New York



IN these views of the working face of the tunneling shield may be seen the lower and upper parts of the erector by which the segments were swung into place.



IN the concrete lining work, Blaw-Knox steel forms mounted on adjustable steel travelers were started at the center of the tunnel and worked both ways, building 60-ft. lengths of the lining.

EACH tube has a 20-ft. granite paved roadway for two lines of one-way traffic, accommodating 1900 vehicles per hour. From the space under the roadway, fresh air, delivered at a rate of 3,761,000 cu. ft. per min., issues through frequent openings at the roadway level and escapes through numerous openings in the tunnel ceiling. The estimated cost of operating the ventilating system, designed to prevent longitudinal air currents, is \$350,000 per annum.



How to Dry Blast Furnace Gas

Silica Gel Tried in England—Gayley Process Compared
—High Frequency Induction Melting and Boiler Steel
Brittleness Reviewed by British Steel Men

(Special Correspondence*)

THE proceedings on the second day of the fall meeting of the Iron and Steel Institute at Glasgow, Scotland, Sept. 20 to 22, opened with an announcement by the secretary that Carnegie gold medals were awarded to the following:

J. H. Whiteley for his research on "The Eggertz Test for Combined Carbon in Steel."

Frank Bainbridge for his research on "The Effect of Fluorspar Conditions on the Phosphates in Basic Slag."

A. L. Curtis for his research on "Steel Molding Sands and Their Behavior under High Temperatures."

The papers, which were read on that day and some on other days, are abstracted as follows:

Use of Silica Gel for Drying Blast

UNDER the above title, Edwin H. Lewis described the plant erected at the Wishaw Works of the Glasgow Iron & Steel Co., Ltd., to treat 35,000 cu. ft. of air per min. through the medium of silica gel. The main features, from the blast furnace point of view, are that at atmospheric temperature it can absorb up to at least 20 per cent of its weight of water from the air with an efficiency of 99 to 100 per cent, and that by raising the temperature this water can be driven off, leaving the re-activated gel ready for another cycle.

Since this plant was erected, the Wishaw Works produced the largest amount of iron recorded in their history and the fuel consumption was the lowest for many years; not less than $7\frac{1}{2}$ per cent of the increased output was apparently due to drier blast, and a substantial return has already been shown on the capital cost.

As to the question of the best degree of dryness in the blast, it is generally agreed that improved furnace operation follows with increased dehydration down to 1 grain per cu. ft. On the other hand, certain reactions in the furnace are slowed down when the gas is below "calcium chloride" dryness, which represents about 0.1 grain per cu. ft. What happens in between is not known. Silica gel offers an opportunity of exploring the unknown field between 0.1 and 1.0 grain per cu. ft., and it is hoped at Wishaw at a later date to venture into this region.

William Simons said that the first practical application of extracting moisture was in 1904, when Mr. Gayley read his paper before the institute. At that time a great number of people followed Mr. Gayley's suggestions. Half a dozen plants were put up in the United States; one was put up at Cardiff, and he thought one was erected in Germany. The cost of the Gayley process was very great, and very little compensation was obtained for it.

On the previous Monday he saw the silica gel process at Wishaw, and was much impressed with its simplicity. The only moving parts were the fan and the motor working it, contrasted with the Gayley system in which there was a 300 hp. engine working the ammonia compressor, the brine pumps and the condenser plant. It would therefore be seen at once that the silica gel is a striking departure which will reduce very materially the cost of extracting the moisture.

He did not know whether the author is not quite right in observing that the money might have been better spent in improving other conditions. At any rate it is very important, he said, to get the highest efficiency

in the stoves, to reduce the amount of gas that is used in the stoves, and to get as much surplus gas available as possible in order to reduce fuel consumption in the works, particularly when it is found, as is the case in his works, that by the use of a dry air the value of the gas is reduced by so doing. The author had shown that, with a difference of about 3 or 4 grains, an economy of 10 per cent is obtained. That had not been the experience in his works, but the blast furnace manager is of the opinion that the furnace worked better and that there was an economy in coke consumption.

Blast Furnace Is a Gas Producer

Benjamin Talbot, the president elect, thought Mr. Simons had referred to the key to the position when he said, in speaking of blast furnaces as a department of a modern steel plant, that it is necessary to consider exactly the composition of the gas obtained from the blast furnace. If a larger volume is obtained for use in the other departments he believes greater economy will be forthcoming. In other words the blast furnace is a more effective gas producer than a separate gas producing plant, when it can be produced as a surplus.

Gayley Process Costly

As a means of drying air, David E. Roberts thought the one under consideration deserved very careful study. It is impossible to tell until it has been in practical use for some years whether all the results that the author has given will be borne out in actual practice. He is one of those who listened to Mr. Gayley describe his process in New York in 1904, and it seemed to him then that it had a tremendous future before it. But unfortunately, partly due to the excessive cost of running the plant and for other reasons, it had not been the success first anticipated. In fact when he was in America a year or two later he was told that the Gayley process fell short in actual practice. Whether the same experience would be attained with silica gel, he did not know. It was certainly an exceedingly simple arrangement.

Use of the Gas Important

Personally he had always felt that dry air is right. He had looked into a blast furnace using dry air and found that the combustion seemed to be better, while the operators told him that the operations were more regular. On the other hand he thought the feature of blast furnace working in this country which needed the greatest amount of attention was the use made of the gas obtained from the furnace. In modern equipments kept at the highest pitch of efficiency, in the works in Germany, America and other places, it was noticeable how much trouble was taken to utilize everything to the greatest possible advantage.

James Henderson did not agree with some of the authorities that the blast furnace ought to be treated as a gas producer. On the contrary, he thought every effort should be made to cut down the amount of fuel consumed, even at the risk of reducing in the number of B.t.u.'s the quality of the gas that was obtained.

Silica Gel in Another Role

Prof. C. H. Desch thought the author's very important paper contained the first definite proof of the real value of a dry blast supported as it was by a carefully arranged set of figures. The process of drying by using some adsorbing material for the moisture, which had been tried at so many places, depended entirely on

*Reports of other papers presented before the Iron and Steel Institute appeared in THE IRON AGE, Oct. 6 and 13.

the perfect reversibility of the drying agent. He understood the experiments made in Germany with calcium chloride failed because the process could never be made perfectly reversible. A very slight overheating of the calcium chloride during reactivation spoiled it. The most remarkable feature of the material silica gel is that it seems to be perfectly reversible.

He described the behavior of silica gel in experiments different from those of the author's. One specimen of silica gel in use for three years had been used over and over again for adsorbing all kinds of vapors. Recently the original specimen was put through the first experiment to which it had been subjected three years ago, and the curves of adsorption obtained for the vapor were exactly the same. Apparently its repeated use with a variety of material had not affected the structure of the silica gel. That statement, he said, could not be made of any other drying agent.

Blast Furnace Not a Gas Producer

E. H. Lewis, in reply, referred to the ease of operation mentioned by Mr. Simons. A 20-hp. motor was required for pushing the activating gas through and some hand-operated valves. When the experimental stage was finished, he thought the whole plant could be looked after by one moderately responsible man per shift, a fairly well-trained furnace man.

Three Ways to Economize Fuel

With regard to Mr. Talbot's remarks on the use of gas in steel works, if it be desired to economize fuel in the blast furnace, there are three ways, and three ways only, in which it can be done. In the first place it would reduce the quality of the top gases; in the second place it would reduce the quantity of the top gases; and in the third place it would reduce sensibly the heat of the top gases. The user of the gas for other purposes must carefully weigh up the possibilities and see whether it was better to run the furnaces as gas producers or to have a separate gas producer plant.

One point which had not been mentioned, he added, was that if it is desired to run the blast furnace as a gas producer, it is far better to run it as an efficient gas producer, and that would be attained by keeping a constant blast.

He thought it was possible that several of the Gayley plants which were stopped were stopped for the reason that it was found far better to spend the money in other directions and not to worry about the maintenance costs of keeping the Gayley plant running.

Constant Moisture Means Better Iron

In regard to Mr. Talbot's remarks, he suggested that, if a blast furnace were being run as a gas producer with constant moisture in the blast, one would obtain, in addition to better general running, a much improved quality of iron. He regarded it important to pin down one of the many variables. One of the variables was the size of ore. During one of the last three weeks, owing to a sudden change in the nature of the ore used, the output in his plant dropped 10 per cent, due to that one variable only.

High Frequency Induction Melting

A PAPER on the use of high-frequency electricity for melting metals was contributed by D. F. Campbell. It is a method which is now available for the industrial production of steel, and is applicable to the melting of tool steel and the manufacture of small steel castings. With high frequency rotary generators now available at reasonable cost the furnace installation is simple, as it consists only of the motor-generator, a bank of condensers to improve the power factor of the furnace circuit to any required degree, and a tilting furnace of simple but unusual design. In addition, suitable control instruments, regulator and switches complete the electrical plant.

A record showing a typical day's work with a small unit of only 100 kva., pouring 3 cwt. of high-grade nickel-iron alloys from a siliceous crucible entirely free from carbon, gave the following result: 9 heats, charge 3024 lb., 11 hr. total melting time; 11 hr. 40 min., total time melting and pouring.

The cost is about equal to that of small Héroult arc

furnaces, and the steel is made under crucible conditions, with the advantage of absolute homogeneity and an intensity of mixing and a melting temperature which is only limited by the refractories and the melter operating the furnace.

The president, Mr. Harbord, in inviting discussion, said he had inspected one of the author's furnaces about a fortnight ago, and it was a most interesting sight to see the molten steel pouring out of a furnace contained in a wooden box. The temperature outside the furnace was so low that there was not the slightest risk of the wood becoming ignited, but nevertheless molten steel was pouring out from the interior. It was a crucible furnace in which the heat was developed in the center of the mass.

Dr. C. H. Desch said that he was a strong believer in the principle of high frequency heating. He had seen the high frequency induction furnace working very successfully in America with nickel alloys, and owned to a deal of experience with the earlier type of high frequency induction furnace, the Ajax-Northrup furnace. It is possible, he said, to melt material of very high melting point in a short time without any danger of contamination.

The great achievement of the author was, he thought, that the frequency had now been brought down to about 500, so that, instead of having to use the very difficult and troublesome sparking gaps as a source of high frequency current, a rotary generator is used.

Some Metallurgical Advantages

In Sheffield crucible practice the really essential feature is the killing fire at the end of the operation. For some time the steel lies in the crucible in a perfectly tranquil state, the tiny particles of slag, floating up to the top, being removed as a button at the time of casting. In high frequency melting the metal is in a very turbulent condition; the convection currents in the steel are so violent that there is a great difference in level at the top. That, he urged, tended to prevent the elimination of very small slag particles. If one switched off the current and left the metal in a tranquil state, the heat capacity is so small and the temperature of the surrounding space so little above the atmospheric temperature that, as soon as the current is shut off, the metal begins to cool down very rapidly.

There is the great advantage, however, in high frequency melting that, as there is no contamination from furnace gases and no carbonaceous material in the crucibles, it was possible to start with quite pure materials, inclose the whole apparatus in a vacuum and exhaust the air, practically no slag being formed. It is possible, therefore, to manufacture steel without having any slag introduced, and in that case the turbulence of the molten metal would not be a difficulty. From the crucible maker's point of view that question has to be considered rather carefully, he added.

Mr. Campbell, in reply, said that Professor Desch had referred to the convection currents in the furnace, a general term which meant the violent disturbance due to convection in the electrical field. That was principally due to electrical effects. He had recently carried out some interesting experiments in that connection because some people supposed that that violent current would cause oxidation to an excessive degree. They had recently been melting aluminum foil or paper in large quantities, and it was interesting to see that the metal being made would rise about $2\frac{1}{2}$ in. in the crucible. It formed part of a sphere. The center of the melt was at least $2\frac{1}{2}$ in. higher than the side. In the case of steel it was 1 in. higher. In the case of aluminum foil the oxidation loss was very low, because the sphere to which he had referred was covered with a skin, and the same happened in the case of the steel. There was a skin or film of oxide on the surface which was not broken to any extent. They had succeeded in melting fairly large quantities of aluminum without oxidation, or with much less oxidation than in an ordinary crucible furnace.

Professor Desch had dealt with the most interesting question of the crucibles, stating that when a crucible cracked it did not matter because the metal was held up by the backing behind it. That was sometimes the case. If the crucible went before the backing had had time to get heated against the crucible it went through

the bottom, but the damage was not excessive. In his experience several lots of 300 or 400 lb. of steel had gone through the bottom of the crucible. It sometimes ran against the coil, but it was immediately chilled against it. It could usually be got off the coil, but if not there was no difficulty in cutting one's circle out of the coil and repairing it.

The Question of Temperature

The president inquired how long it was possible to hold a charge of about 3 cwt. in the furnace. He presumed it could not be held for very long because the cooling was so relatively rapid.

Mr. Campbell replied that apart from metallurgical questions and dealing purely with the question of temperature, if it was a case of 300 or 400 lb. of metal, it could be kept hot without difficulty for at least a quarter of an hour. He was not referring to Doctor Dench's experimental and laboratory plant where only 10 lb. of metal was dealt with. The heat insulation was extraordinarily good. Special insulating sand was being used, but a good deal depended on what material of that nature was employed. They were working partly with plumbago crucibles for high-speed steel, and were also using plain crucibles with a backing of ganister or silica sand, which would not keep anything like as well as zirconium. With a plumbago crucible and a good lining of zirconium, if there was a good heat in the furnace the metal could be kept hot for a quarter of an hour. Incidentally, however, there was no necessity to do that because the current could always be regulated in any way one liked. If a large number of very small castings were being poured the furnace body could be taken away to cast with and another put in position and melted up while the first one was being used for casting.

Temper-Brittleness of Nickel-Chromium Steels

WITH the aid of a Carnegie Research Fellowship, H. A. Dickie, Glasgow, has been investigating at the Royal Technical College, Glasgow, magnetic and other changes concerned in the temper-brittleness of nickel-chromium steels, and his explanation of temper-brittleness is, briefly, as follows:

When a steel susceptible to temper-brittleness is cooled slowly from a high tempering temperature, a portion of the carbide, which exists at that temperature in solid solution in the ferrite of the steel, separates out, giving definite modifications of magnetic properties and specific resistance. This also results, at moderate cooling rates, in a contraction and softening, as shown by specific volume and hardness tests. When, however, the rate of cooling is extremely slow, the steel expands and hardens again—relatively to the moderately cooled state—and this is evidently due to the formation of a network of carbide round the grains, producing, by its predominant effect on the coefficient of contraction and its influence in increasing the resistance to penetration, an increase in specific volume and in hardness respectively. Deposition of carbide from solid solution will not, in itself, induce brittleness in the steel. It is only when the rate of cooling is sufficiently slow to allow of expulsion of the carbide to the grain boundaries that brittleness develops.

Dr. W. H. Hatfield, director Brown-Firth Research Laboratories, said he did not think the experimental work and the results obtained could in any sense be questioned as regards fact, and he thought the author had materially added to the knowledge of the physical properties of nickel-chromium steels in the two conditions described. From his own point of view he would be inclined to question a little the author's theoretical deductions. He desired to point out that the author was hardly correct in speaking of the slow-cooled steel as brittle steels. He suggested to the author that a better term was "notch brittleness."

Behavior of Mild Steel Under Prolonged Stress

In a paper of the above title Dr. W. Rosenhain and Dr. D. Hanson described investigations into the cracking of mild steel exposed to elevated temperatures. The material used was a mild steel strip containing 0.106 per cent carbon, a trace of silicon, and 0.395 per cent of manganese with very low impurities. The experiments showed that the samples were capable of with-

standing severe stresses up to two-thirds of the normal breaking stress for prolonged periods at 300 deg. C. In the present tests these stresses have been withstood for over five years, and it seemed likely that the steel would withstand such stresses indefinitely. Steel subjected at 300 deg. C. to stresses between one-third and two-thirds of the normal breaking stress became considerably hardened, although the amount of straining was very slight.

C. E. Stromeyer, in opening the discussion, said he had devoted a good deal of his attention to discovering the reasons why steel plates cracked every now and then. He published a paper in the previous year in which he called attention to the fact that out of a large number of failures he examined, in a good many of which he was able to discover the reason of the failure, 13 samples remained for which he could offer no explanation. There was low phosphorus, very little nitrogen, no carbon, and no chance of caustic embrittlement.

He was now doing his best to discover the cause of the brittleness in those 13 samples, but it was not quite as simple as the authors seemed to think. Some of the failures were in the centers of the plates. They did not start at the rivet holes, but there were little patches of brittleness in the steel. He hoped some day to be able to throw some light on the subject, but that day was not yet.

J. H. Whiteley said that the sample of steel which the authors had chosen to experiment with was not exactly typical of boiler plate; makers were not supposed, for instance, to make boiler plates with 0.075 per cent of sulphur, while the carbon and the manganese were low. In his opinion that steel was inferior for boiler plate, but of course that did not affect the results, and if such steel stood up to continued test he had no doubt that boiler steel would do the same.

The tests were interesting particularly because they had been made at about 300 deg. C., which was what was called blue heat. He had found many times that if a plate was sheared at a blue heat it was liable to be brittle. Test pieces sheared off a plate at blue heat frequently snapped on bending, although if they were sheared cold they bent easily. As Mr. Stromeyer had said, it would be interesting if the authors could bend some pieces in that direction. The conditions of the experiment were not exactly those which obtained in service.

Some Cases of Peculiar Embrittlement

In his long experience of the manufacture of boiler plates, of which he had seen and supervised the manufacture of many tens of thousands of tons, he had never yet met with a failure of such plate. He knew, however, that other works making boiler plates had had serious trouble. In one case he had in mind, in a works making plates by the same process, acid and basic, some of the plates when sheared in one direction failed, the corners breaking off or the plates falling in two. He had a sample sent to him of that peculiar brittleness in steel made by the same process with practically the same material that was used in his own works, but after long examination of that piece of steel he had not been able to discover why the failure occurred. He believed it occurred somewhere between the ingot and the finished product.

Stresses Possible at High Temperatures Important

Dr. W. H. Hatfield said that at the time the authors put their experiments in hand, from five to seven years ago, it was actually put forward by responsible investigators that steel and other metals exposed at temperatures a little above the normal would fail over long periods of time at very small stresses. That was suggested from the theoretical point of view, but the present tests showed that the results were not what some people thought they were at that time.

It was quite clear that steel might be stressed to very high values at 300 and 400 deg. C. and even slightly higher temperatures, at considerable stresses without a chance of failure when the stresses were left on for a long time. That was a point of very great importance to engineers.

Doctor Hanson, in reply, stated that the tests were not regarded as standard mechanical tests. The steel

was very thin. It was used in the form of very thin strip, and it was tested in the form of a test piece of quite small dimension in which the section was very wide relative to its thickness, so that he did not think the results could be taken as anything but comparative results. The same remark applied to the Brinell numbers. They were not made with the standard load at all, and it was not as fair to assume that the tensile stress could be calculated from the Brinell numbers as they were when the standard test was known. He ventured to suggest that the mechanical test results that were obtained should merely be regarded as comparative results, and the authors had regarded them in that manner throughout.

Work-Hardening of Steel by Abrasion

AN investigation into the hardness induced by severe abrasion in locomotive tires and rails and in hardened steel gears and cams from motor cars was reported on in a paper of the foregoing title by Edward G. Herbert, Manchester. The hardness of the surface layer produced by severe abrasion in service is much greater than that of the original metal, and it occurs whether the articles are hardened throughout or case-hardened. Hardened or case-hardened alloy steels, while differing greatly among themselves in respect to their capacity for super-hardening, are generally capable of a higher degree of induced hardness than plain carbon steels of the same original hardness. The capacity of a metal to resist wear must depend on the hardness induced by wear and not on the original hardness.

The maximum hardness which can be induced in any metal by wear corresponds generally with the maximum hardness induced by the pendulum work-hardening tests. The original hardness of a metal gives no indication of the ultimate hardness of the worn surface, and when

exposed to severe abrasion it has no importance in relation to resistance to wear. It appears probable that work-hardening or super-hardening does not occur unless the conditions of abrasion are so severe as to cause some plastic flow of the metal below the abraded surface.

Repeated Impact on Lowmoor Iron

AN endeavor to reveal the peculiarities of materials when stressed repeatedly by impact is found in a paper of the above title by Prof. J. H. Smith and Dr. F. V. Warnock, Belfast. The tests were made on 7/8-in. diameter Lowmoor iron in bar form containing 99.617 per cent iron. The authors found that there is a limiting range of tensile impact energy that may be applied repeatedly to a material without causing rupture. For a given amount of repeatedly applied tensile shock energy, the total energy to rupture a material is constant. Momentum is not an important factor in causing rupture by tensile impact. When the shocks to produce rupture are below a certain value the elongation is constant and 4 per cent greater, and the reduction in area is constant and 3 per cent greater, than when static means are employed.

In repeated tensile impact, elongation does not increase at a uniform rate, being more rapid at the beginning and end of the test than at mid-test. In tensile impact machines where energy is dissipated in hammers, anvils, etc., the amount of dissipated energy is constant when the area of striking surface is above a given value, provided the height of fall of the hammer is constant. Also, the total energy to cause rupture is approximately three times greater with such machines than with a machine in which no energy is dissipated. Surface finish has little effect on the resistance of a specimen of ductile material to withstand repeated tensile impact.

Business Aided by Intelligence Service

Market Information Assembled by Commerce Department and Waste Elimination Program Prove Their Worth

BY DR. JULIUS KLEIN*

THE curves for the majority of business indicators have traced an encouraging upward path since 1921. Now this sounds like the steady progress of sustained prosperity and, indeed, it has been that, even though the number of commercial failures in 1926 exceeded those of 1921 by nearly 10 per cent. Using 1919 as a basic 100, the production index for manufacturing in 1921 was 81 and by 1926 it had risen to 128; for minerals it was 93 in 1921 and 142 in 1926; for railroad ton mileage it was 87 in 1921 and 123 in 1926; for department store sales it was 110 in 1921 and 136 in 1926; and for mail order house sales it was 72 in 1921 and 123 in 1926.

One factor in this remarkable record should be borne in mind: A busy business is not necessarily a prosperous one, at least for the employer, owner and those dependent upon them in financial and other interested circles. High gross receipts and high profits are not always synonymous. A leading line in the machinery industry recently showed a net turnover amounting to \$14,000,000 a year but a check-up of the 10 companies in that line indicated total profits of only \$130,000.

Nearly 44 per cent of the machinery in one important industrial group is more than 10 years old, which in these days of strenuous competition and constant change threatens to get pretty close to the border line of industrial senility. Modern business, and especially American business, was never more dynamic and volatile than it is today. With such a constantly changing front, it is doubly important that our strategy should be based upon a most effective intelligence

service. One of the outstanding reasons for such successes as have been achieved during the past six years by American industry and commerce is the highly effective contact which has been maintained with this front, the constant check that has been kept upon the operations of those persistent "foes," waste and inefficiency, by the vigilant services of our trade papers and trade associations and the improvement in Governmental fact-finding agencies.

Turning to foreign trade, it will be recalled that there were wide-spread prophecies immediately after the war that we would soon be overwhelmed in every one of our overseas markets under an avalanche of returning European competition. The experience of these years has completely belied such gloomy forecasts. Even at the bottom of the pit in the year 1922, our exports were greater than before the war both in value and volume, having averaged about \$2,130,000,000 a year during 1910-14 and exceeding \$3,830,000,000 in 1922. Our exporters have certainly climbed with surprising speed, having increased their overseas sales by more than one billion dollars during the past five years.

Those commodities whose success in export is most dependent upon efficiency in production and salesmanship, namely, fabricated wares, have shown extraordinary expansion. Our exports of finished manufactures last year were more than 60 per cent greater in value than in 1922, which with falling export prices has meant an even greater quantitative gain. In fact, our exports of finished manufactures are now nearly three times as great as the annual average during 1910-14, which, even after allowing for changing price levels, leaves a margin of considerably more than double in volume.

Obviously the chief problem, when we found our-

*Director Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington. Abstract of an address delivered before the National Conference of Business Paper Editors at Chicago, Oct. 18.

selves at the bottom of the 1921 pit, was the disposal of the incumbrances of wasteful production practices, unemployed workers, inefficient operations, inadequate information as to markets and innumerable other hindrances. The Unemployment Conference of 1921, under the chairmanship of Secretary Hoover, developed a definite program of staggered, off-season undertakings in public works, which contributed materially toward the gradual elimination of some 2,000,000 unemployed during the following 12 months.

Simultaneously, investigations of engineering committees on efficiency in production revealed a startlingly high percentage of sheer waste, the net total of which was estimated to be not less than six billion dollars in our manufacturing industry. With this definite objective in mind, a comprehensive campaign for waste elimination was launched through hundreds of collaborating trade associations and trade papers. The department has maintained contact with this situation through more than 70 advisory committees which have been functioning as boards of strategy upon the problems of their respective trades in this campaign.

The files of the department contain voluntary indications from industry which show that each year the value of the actual results achieved by trade promotive services, not simply in new business, but also in the prevention of wasteful effort, exceeds many times the entire appropriation of the department. In fact, for this year the compilation of these dollars-and-cents results will probably fall not far short of 15 times the amount expended by the department in all of its ser-

vices. And this represents, of course, only one small phase of the department's work.

The appropriations of the bureau of foreign and domestic commerce have risen steadily from about \$900,000 in 1920 to \$4,000,000 at present. Thanks to this more than four-fold expansion, coupled with an increasingly economical and efficient operation, the bureau is now rendering 9500 services to inquiring business men every day as against about 700 a day early in 1921.

These services are intended to enable the trader, whether he is operating abroad or at home, to proceed confidently and securely by reason of his possession of precise data as to marketing practices, economical distribution methods, buying power and other essential elements. In the foreign field, persistent efforts have been made to discourage unpromising trade activities, injudicious financing, dubious procedure in legal and customs house matters, and irresponsible agency connections.

The domestic commerce work of the organization is of more recent origin, but it has already developed a wide field of usefulness through its studies of retail merchandising, its analysis of marketing conditions and buying power in different areas of the United States through its market surveys, two of which, those on New England and the Southeastern States, are now in press. These are really attempts to appraise the potentialities of certain markets with a view toward laying a complete statistical groundwork for more intelligent selling in those territories.

Implement Industry Enters New Era

Mechanization of the Farm Is Forcing Agricultural Machinery Makers to Revise Methods and Reequip Plants

THE agricultural problem is being solved by increasing use of mechanical power on the farm, according to Cyrus McCormick, Jr., vice-president International Harvester Co., Chicago, who delivered an address before the National Association of Farm Equipment Manufacturers in that city on Oct. 12. While the agricultural population of this country has been diminishing, the average size of farms is increasing because mechanical power is expanding the area that a farmer can handle. The application of power to agricultural implements, he said, is bringing about a great change in the farm equipment industry.

"Whereas the horse pulls implements through the field at less than 2 miles per hour, the tractor is operated at much higher speeds and with much greater force. It goes without saying that the implements which were rugged enough to withstand the slow motion and easy draft of horse power cannot stand up under the requirements of power, speed and weight imposed by mechanical power. The result is the beginning—it as yet only a beginning—of fundamental changes in the design, the material and the treatment of material of farm implements; just as power farming is working its slow miracle of revolution in our agriculture, so is it enforcing a revolution in our manufacture of agriculture's implements."

Power Farming Greatly Increases Production Per Man

The increased production per man on the farm with power equipment is particularly significant, according to Mr. McCormick, because it indicates a corresponding decrease in production costs. He quoted an authority as estimating the increased production per man in plowing as 200 per cent, in harrowing 300 per cent, in planting 150 per cent, in listing 200 per cent, in cultivating 200 per cent, in binder harvesting 100 per cent, in harvesting with the combine as compared with the header 100 per cent.

The logic of the agricultural situation demands not only greater production per man, Mr. McCormick said, but also more production per acre. "Here again power farming appears as a factor of large and attractive potentialities.

"Power farming puts into any farmer's hands the means of getting more returns out of his land, while he is reducing the cost of operating it," he added. "As an authority on this subject said to me the other day, 'Power farming isn't merely cheaper farming; it's better farming.'"

Implement Makers Must Improve Plants and Equipment

Mr. McCormick emphasized the manner in which the trend toward power farming is forcing the implement makers to revise their manufacturing methods and to reequip their plants.

"We implement manufacturers are urging the farmer to improve his equipment. Let us ask ourselves if we are doing the same thing in our factories. The agricultural implement industry is old compared with the building of the automobile. We were pioneers in manufacturing in the days when the automobile was still only an expensive toy. Motor car men were able to profit by our researches into what was then modern manufacture. They were able in the 20th century to build their factories upon the lessons we had learned in the 19th; and yet, with all their scientific efficiency, they have never been able to approach the manufacturing economies of our industry, for all our so-called antiquated methods.

Automobile Industry Cannot Approach Implement Makers in Manufacturing Economies

"There is a vast difference between the automobile industry and ours in the greater variety of models and sizes demanded of us by the endless variations of soil, topography, crops and climate, in the number and nature of functions to be performed and in durability; and yet, for example, compare the prices of the lowest priced automobile and the highest priced farm implement.

"The retail price of the cheapest automobile is about 22c. a pound. The retail price of that most modern and most expensive agricultural implement, the combine, equipped as it is with a high-grade internal combustion engine, with high-duty bearings, built of the highest

grade materials by skilled workmen, is about 21c. a pound.

"Nevertheless, in the majority of implement factories the old buildings existing at least since the last generation are witnessing a period of reconstruction. The old drill presses are giving way to more modern equipment."

Marked Gain in Implement Sales

"The trend toward labor-saving equipment in agriculture has never been so marked as during the past season," said R. W. E. Hayes, Hayes Pump & Planter Co., Galva, Ill., in his presidential address before the association. Tractor, thresher and combine manufacturers in attendance at the convention, which was the thirty-fourth annual meeting of the organization, reported a gratifying increase in sales and production during the past season. Tractor manufacturers have been running overtime in many cases and report increases in sales of from 25 to 60 per cent over 1926, which was a record year with a total production of over 170,000 machines. Increases in other lines of machinery were reported, but not in such large volume as in the heavy lines of power machinery. The general average gain in farm equipment output was estimated at 35 per cent over the 1926 production. The output of one large manufacturer has increased 100 per cent. Heavy shipments of harvesting machinery are now being made to the Northwest. A new development in harvesting equipment, the combine, has made rapid

strides throughout the Plains States. Twelve thousand of these machines are in operation in Kansas, as against only about 4000 a year ago. The combine eliminates three farm hands and makes it possible for a farmer and one helper to harvest 500 acres of wheat. The use of the machine is spreading eastward, and there are already 250 of them in Illinois, which is usually regarded as a small-farm territory.

The outlook in the farm equipment field for the remainder of the year is exceptionally good, since most manufacturers have substantial order books. The general impression is that 1928 will be another good year, particularly from the standpoint of tractors, which are now making rapid headway in supplanting horses.

Forecasts Increase of \$300,000,000 in Farm Income

Implement manufacturers expect to profit by a further increase in farm income. "It is now forecast," said Mr. McCormick in his address, "that the cash farm income of the country for the crop year July, 1927, to June, 1928, will total \$300,000,000 more than last year."

The farm machinery industry, however, is encountering sharper competition in foreign countries. Exports of agricultural equipment in the first six months of this year were \$6,000,000 smaller than in the same period of 1926. "Farm machine production by European factories is commencing to make itself felt," asserted Mr. Hayes in his address.

Unusual Billet Charging Equipment

Operator's Control Box Carried Like an Accordion—Large Saving in Labor Reported

AN overhead crane with span of 60 ft., with its automatic control board in the power house, is utilized by the Phoenix Iron Co., Phoenixville, Pa., to charge billets into a heating furnace. The billets are picked up by means of a bipolar lifting magnet, with a control box containing a row of push buttons and carried by the operator by means of a strap around his neck, much as an accordion is carried.

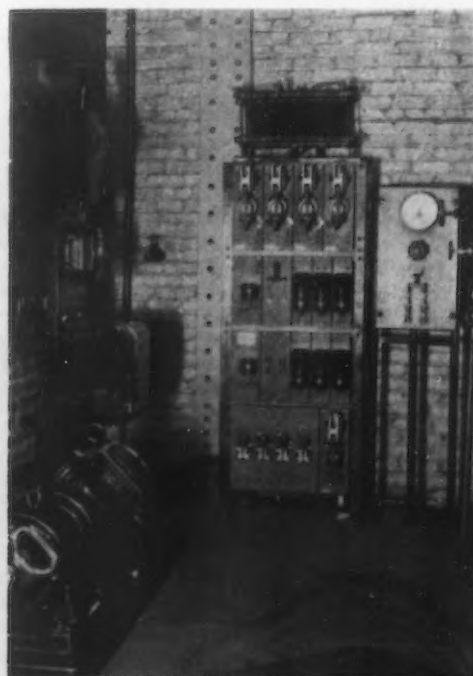
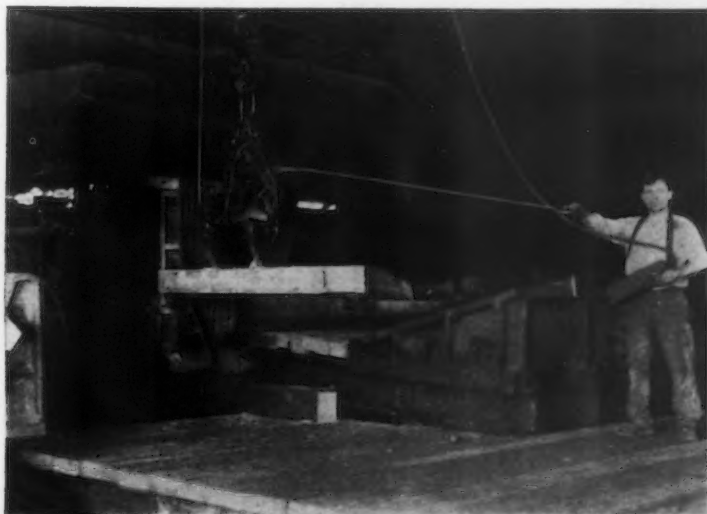
Eight men, four on each turn, are reported to have been eliminated since this equipment was installed. The operator guides the position of the magnet by means of the handle shown, while with his other hand he governs its raising and lowering, the traverse of the

trolley on the crane, and the energizing of the magnet. The man's controller has three pairs of push buttons for the two motions of each of the three elements.

While the crane, which is a 3-ton Shepard unit, is fixed in position, the trolley travel covers its whole span of 60 ft. The trolley is operated by a 2.6-hp. motor and the hoist by a 10-hp. motor. The control equipment was installed by the Electric Controller & Mfg. Co., Cleveland.

For the sake of safety, the four buttons controlling the crane operate only while they are being pressed. As soon as the finger leaves the button, power is shut off and movement stops.

Below Is Shown the Way the Man "Steers" the Magnet with One Hand and Controls Its Movement with the Other. At right is the automatic equipment in the power house



Better Boxes for Malleable Annealing

Proper Chemical Composition Essential—Thermal Deterioration Must Be Considered—Recommendations Made

BY J. H. HRUSKA*

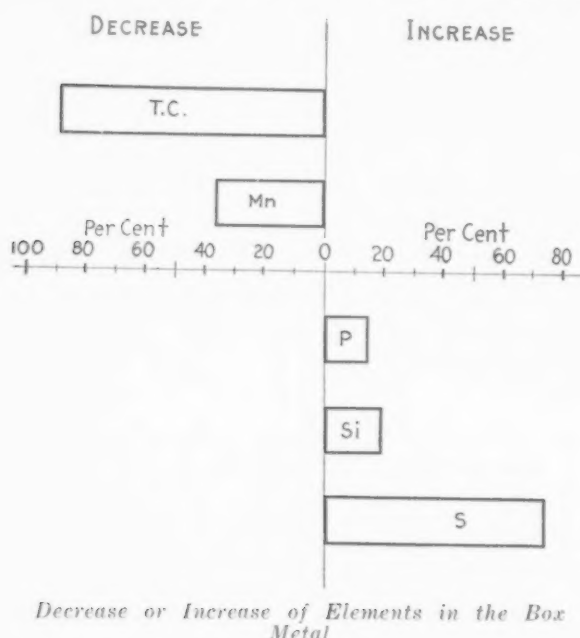
ALTHOUGH the problem of thermochemical deterioration of ferrous matter has attracted the attention of metallurgists for many years, there still remain a few realms in the iron and steel industry where practically and economically no improvement has been made. For example, in the malleableization of hard iron castings, the old cast iron pot is still considered by most foundrymen the simplest and cheapest container for the hard iron castings.

In addition, there are still many malleable manufacturers who believe that iron of any chemical com-

the carbon is being oxidized first. Then follows the manganese. According to many observed cases the sulphur, silicon and phosphorus contents seem to increase. Particularly the increase of sulphur, which in many cases is far greater than in the test previously mentioned, will undoubtedly cause brittleness of the pot.

The pot iron being under continuous static load of the charge at high temperatures will, particularly toward the "end of its life," become worse and worse in quality. Samples taken from burned pots contained up to 97 per cent Fe O and 0.360 per cent S with only traces of carbon, thus pointing out the way along which the increase of the number of heats per pot can be made. Therefore with higher carbon, silicon and manganese contents, very good results have been obtained.

With additions up to 0.01 per cent aluminum and up to 0.40 per cent chrome to the molten pot metal, further improvements and lower annealing costs are to be expected. If a cupola is being used as the melt-



position is "good enough" for annealing boxes. Careful tests, however, have proved that even a box should be made according to certain chemical standards if a maximum life and, therefore, lowest cost for boxes per 100 lb. of castings is desired.

Chemical Composition Outlined

From the analyses given in Table I the considerable variations in chemical composition of boxes made by various malleable foundries can be noted. Comparing these analyses with the results in the shop, the importance of composition is apparent.

Furthermore, it is obvious that pots of identical analyses will give different results when used in the old type annealing furnace from those in a modern tunnel kiln. Comparative tests have proved that differences in the chemistry of annealing pots are more noticeable in small annealing furnaces where the fluctuations in temperature are more pronounced than in a well controlled and insulated tunnel kiln.

Thermal Deterioration a Factor

In order to secure certain ideas about chemical changes of the constituents, an annealing box was analyzed prior to its use and the composition of its material again determined after scrapping. The results of this investigation are compiled in Table II and graphically expressed in the diagram.

It will be noted that, of all the chemical elements,

Table I—Chemical Analyses of Annealing Boxes Used by Various Manufacturers

Total Carbon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent	Silicon, Per Cent
2.46	0.18	0.212	0.283	0.54
2.51	0.09	0.268	0.302	0.42
2.68	0.52	0.328	0.108	0.63
3.38	0.48	0.132	0.094	0.79
3.32	0.63	0.202	0.076	0.86

Table II—Changes of Chemical Composition of Various Parts of an Annealing Box

	Average Analysis of the Box Metal Prior to Its Use Per Cent	Analysis of Deteriorated Metal After Being Scrapped	
		Actual Analysis of 2½-In. Lug	Actual Analysis of ½-In. Box Wall
Total carbon	2.54	1.48	0.27
Mn	0.22	0.17	0.14
P	0.242	0.254	0.278
S	0.054	0.091	0.094
Si	0.68	0.74	0.81

The changes of chemical composition are graphically expressed (for the ½-in. box wall only) in the diagram.

ing furnace, a forehearth will eliminate partially the non-uniformities in chemical composition of the molten metal—particularly if the cupola is of smaller capacity.

Conclusions

From a production point of view it is a rather surprising fact that almost no progress can be detected in the manufacture and use of annealing boxes during the last few years. And yet the malleable industry can probably lower considerably the costs of malleableization by studying this particular problem. Further investigative work along the lines as indicated in this short discussion would undoubtedly be of interest and value to those connected directly or indirectly with this matter.

Reporting average weekly earnings in various industries, the National Industrial Conference Board shows \$32.53 in July for iron and steel. This is the highest given for any industry, except printing of newspapers and magazines, with \$37.46. The average hours of work for iron and steel are given as 50.9 to the week. This is exceeded by Southern cotton mills, with 51.2, and the meat packing industry, with 51.7 hr.

*Metallurgical engineer, 2328 South Euclid Avenue, Berwyn, Ill.

Exposition a Foremost Topic of Discussion at Machine Tool Builders' Annual Meeting

WITH the unquestioned success of the association's first exposition, held at the Public Auditorium, Cleveland, Sept. 19-23, vividly before all members, discussion relating to the holding of the next exposition naturally assumed a major place in the deliberations of the National Machine Tool Builders Association's twenty-sixth annual convention, which was held at the Hotel Aspinwall, Lenox, Mass., Oct. 10-13.

The convention was unusually well attended. Two proposals considered were: Not to exhibit machine tools during the coming year at any exposition not conducted by the association, and not to hold the association's second exposition during 1928. Although the enthusiasm shown left no doubt as to the sentiment in favor of a second exposition, there are apparently several considerations that make it advisable to defer final decision as to the date of the next show. Accordingly it was voted, at the last session of the convention, to authorize the board of directors to appoint a committee of five to study the entire subject and submit the pros and cons to the membership at an early date, after which the member companies could express their ideas by letter ballot or otherwise. It is to be noted that the sentiment of the association is strongly in favor of holding its own exposition, the only undecided matter being the time of holding it.

P. E. Bliss Elected President

Although the holding of the next exposition was the absorbing topic of discussion, several other matters of importance to the industry were the subjects of addresses, committee reports and round table discussion, as noted in the following paragraphs.

Three new members were elected to the board of directors, which in turn elected the following officers of the association:

President, P. E. Bliss, vice-president Warner & Swasey Co., Cleveland.

First vice-president, Henry K. Spencer, secretary Blanchard Machine Co., Cambridge, Mass.

Second vice-president, Henry Buker, vice-president Brown & Sharpe Mfg. Co., Providence, R. I.

Edward A. Muller, president King Machine Tool Co., Cincinnati, continues as treasurer and Ernest F. Du Brul, 826 Provident Bank Building, Cincinnati, continues as general manager of the association.

A. H. Tuechter, president Cincinnati Bickford Tool Co., Cincinnati, and C. C. Swift, manager Ohio Machine Tool Co., Kenton, Ohio, continue as directors. The new directors are: J. E. Andress, president Barnes Drill Co., Rockford, Ill.; H. W. Dunbar, assistant general sales manager Norton Co., Worcester, Mass., and H. E. D. Gray, secretary and treasurer Landis Tool Co., Waynesboro, Pa.

Facts and Values of the Cleveland Exposition

THE large-scale success of the association's exposition held in Cleveland was commented upon by President James E. Gleason in his address opening the convention. "The hopes expressed by many in the spring, that the exposition would mark an epoch in the development of machines, have been realized to a remarkable degree," he said. "Not since the Centennial Exposition at Philadelphia, 50 years ago, has such a demonstration been made of progress in our industry as was set up in this exposition. Never has excellence in materials used and beauty in design been so skillfully united with outstanding efficiency."

In referring to the holding of the next machine tool exposition Mr. Gleason said in part: "One of the questions we have to decide is whether it is necessary or expedient to burden an industry already so hard pressed as our own with so great an expense at frequent intervals."

"There are no season fashions in the machine tool field, nor are sales stimulated by changes in design which are not based upon sound engineering and which do not result in greater production or reduced costs. There is no doubt that in the automobile field, by showing of new styles and minor improvements, a large increase can be made in the number of orders taken, because the machine sold is one of comparatively short life. I think that we should consider carefully how far this applies to the machine tool field where the article sold has a long, useful life. In the automobile field we have a demand of great variability; in the machine tool field, a demand which can be expanded only within narrow limits, and where fashion has, comparatively speaking, little influence."

Some of the minor questions, relating to the place of holding the exposition, etc., were also touched upon. In concluding this part of his presidential address Mr. Gleason said:

"I hope that in deciding these questions we shall all recognize that there is much to be said on both sides, and try to arrive at a conclusion which will result in the greatest good to the greatest number. I should like to urge that no hasty action be taken, but after the thing has been thoroughly discussed in the convention, that perhaps it would be better to take a vote by ballot after each member has returned home and had time for proper reflection on this important matter."

Exposition Leaves Good Balance in Treasury

Interesting data were presented by the exposition committee, the chairman of which is J. Wallace Carrel, vice-president Lodge & Shipley Machine Tool Co., Cincinnati. "The industry put on the show to present its products to the men interested in them," states the report. "The success of the policy in excluding the general public was fully confirmed by the number and character of the visitors, who were company officers, works managers, superintendents, engineers, foremen and operators."

The actual attendance was put at over 12,000. The supply of registration cards and badges was exhausted by noon of the last day, and it was necessary to let the afternoon visitors enter by verbal statements of their connections. With booth men, dealers' salesmen, the "open house" attendance of one evening, etc., deducted, and allowing for the unregistered surplus of the last day, the visitors "of the kind we sought" was estimated at 10,000.

This large select attendance is attributed in a large degree to the cooperation of the sales organizations of the industry, who for months had impressed their customers and prospects with the importance of the show. This word-of-mouth advertising of the members was supplemented by trade paper and direct-by-mail advertising by the association. The mailing list com-

piled by the association office, from the lists contributed by members and dealers, contained 25,070 names, which was 5000 more than expected.

"In no other way could the industry show its products in operation to so many of its customers," said Mr. Carrel. "Every booth made a continuous five-day demonstration to interested potential buyers. The show brought vividly to the visitors the importance of an industry that could show 428 operating machines, ranging in size from a milling machine weighing 100,000 lb. down to small portable units, such as electric drills. Certainly the size of the show impressed them with more respect for the industry's importance than they ever gained by scattered contacts with individuals, or by small displays of tools in other exhibitions. Many



P. E. Bliss, President-Elect of the National Machine Tool Builders Association. Mr. Bliss is vice-president of the Warner & Swasey Co., Cleveland

of the machines shown were entirely new, shown for the first time; many others embodied new features. These facts enhanced the visitors' respect for the technical progress of the industry.

"These promotional institutional effects were, after all, only by-products. It now remains for the industry to turn the exposition's opportunities into cash profits. While that of course is a matter of time, it is worth while considering now just what these opportunities mean.

"Suppose we count a safe minimum of 10,000 visitors. We believe that the average per capita cost to the visitor, in time and expenses, was easily \$100. On that basis our visitors spent at least \$1,000,000 to come and see our goods.

"Typical exhibiting companies have told us their estimates of actual exhibiting cost. From these samples we estimate an average expenditure of \$5 per sq. ft. of booth area. For the 65,000 sq. ft. this would mean a cost to exhibitors of \$325,000 for showing their goods. There certainly was much potential value in a show

when our customers probably spent three times or more the amount of money to come and see our goods than we spent to show them the goods."

In speaking of estimating the promotional value of the money spent by individual exhibitors, it was pointed out that the exhibitor could divide his total expense by the number of visitors to whom he had demonstrated his products. "We think," states the report, "that it would be found that the unit cost of demonstration was a very low figure."

It was also pointed out that the number of names left at the various booths by visitors have given many exhibitors long lists of interested prospects. "Dividing these definite numbers into the exhibitor's expense," continues the report, "will show the cost per live prospect interested. We believe this to be much lower than could be secured in any other way."

Data relating to the exhibitors and booth area were given as follows:

	Exhibitors		Booth Area	
	Number	Per Cent	Sq. Ft.	Per Cent
Member exhibitors...	108	58.6	43,150	67.9
Non-member machine tool exhibitors....	25	13.7	8,830	13.9
Total machine tool exhibitors	133	72.3	51,980	81.8
Accessory exhibitors	51	27.7	11,600	18.2
Total	184	100.0	63,580	100.0

It was stated that the exposition leaves a good balance in the association's treasury, to be dealt with as the directors of the association see fit. Appreciation of the work of General Manager Du Brul and his assistant, Mrs. F. F. Selbert, Roberts Everett, the Cleveland Auditorium staff, the Norris Co. staff, the Cleveland Convention Board staff and others contributing to the success of the exposition was expressed in the committee's report. Tribute was paid the exposition committee, Mr. Du Brul and others by President Gleason in his opening address.

Enthusiastic reference was also made to the Cleveland exposition in the report of E. F. Du Brul, general manager of the association. "We who saw the exposition grow under our eyes during the installation week," he said, "got a better idea of its magnitude than anyone could who came into the operating show after it started. From that perspective we can certify that the Machine Tool Builders put on a most remarkable show, one that marked an epoch not only in machine tool progress, but in the history of this association as well. What metal product of medium size could not have been designed, tooled and fabricated right there by the world's best engineers, workmen and machinery? We had the world's best of each right there on the floor."

Comment on the Machine Tool Congress, which held its first meeting in Cleveland during the week of the exposition, was also made by Mr. Du Brul. "This organization," he said, "has a fine promise of development into a valuable forum for exchange of thought on all questions of mutual interest to users and builders of machine tools. It should be encouraged and fostered by our membership."

Business Conditions in Machine Tool Industry

BUSINESS conditions in the machine tool industry were also touched upon by President Gleason in his opening address. In this connection he said in part: "Business generally appears to have been a little less than it was last year, and as we look ahead it seems reasonably certain that our final reports for the year 1927 will show that as an industry, we have sold somewhat less this year than last, and that what profit we got last year has been further reduced. And yet, in my judgment, the year that has passed may be considered a good average year for our industry so far as total production is concerned.

"The bad circumstances which surround selling prices and profits are not confined to our own industry. We hear the same cry from the steel makers, from the pig iron producers, and from other basic industries, that some of the product is sold either at no profit or at a loss, that the capacity for production is still far ahead of demand."

Another section of Mr. Gleason's address was de-

voted to engineering service. On this he said: "One of the most striking characteristics of the show was the large number of special machines exhibited. This specialization of machines to fill the definite demand which has arisen for them has compelled the manufacturer to expand greatly his designing and production staffs. We see a tendency to concentrate in one establishment complete engineering and production knowledge of various types of machines in one art, such as turning, drilling, grinding, etc. It seems no longer possible to stick to a limited number of machines.

"With the development of this special machinery has come a vastly increased demand on the part of our customers for engineering service. Sometimes a machine has been entirely redesigned to fit the needs of a single large producer. In such cases the advantages of the machine have to be fully demonstrated to the supervisory organization, and more or less extended instruction given the machine operators. And



Officers of the National Machine Tool Builders Association: (from Left to Right) Henry K. Spencer, First Vice-President; Henry Buker, Second Vice-President; Edward A. Muller, Treasurer; and Ernest F. Du Brul, General Manager

if a problem arises at any time in regard to the work, the machine builder is called upon to send a man from the factory to help solve it, even to the extent of investigating shop methods and processes entirely beyond the functions of the machine itself.

"So long as this engineering service does not pass reasonable bounds it may be given free of charge. If a concern spent a very large sum of money on special broadsides or erected signs boosting its product, who would be willing to say that it was acting against the general good, or contrary to sound business policy. Free engineering service is directly analogous. It is given to advertise the seller—to create good will—to make closer contact with the user and so retain his business. The management of each individual concern must determine for itself how much money it will spend in such free engineering service, just as it has to decide what amount it will spend in any other form of advertising.

"But because of the large increase in special machines, customers have come to expect help on very special problems. It is difficult even for the best service men in our customers' shops to know everything there is to know about the complex machines now in use. These have come to rely, for recommendations that will best fit their special requirements, on engineers and production specialists from the machine tool builder's staff, men who have made a comparative study of the uses of their machine in its relation to a wide variety of methods and processes in different plants.

Should Not Ignore Requests for Engineering Assistance

"Our customers realize that due to our opportunity for special study we must know more about all the little peculiarities of our machines than men can in their own organizations, and so are equipped not only to give the best advice in regard to what jigs and fixtures are necessary, but actually to design them more efficiently and economically.

"The machine tool builder cannot ignore and should not want to avoid these requests for engineering assistance. He should welcome them and build up an organization that will adequately satisfy this call from his customers. He cannot, however, disregard the cost. It would be unfair to load on his customers generally the burden that would belong to a limited number.

"I believe the time is soon approaching, if it is not already here, when every firm will have to make a special charge for all service which involves the solving of the particular problems which are outside of the general operation, care, and maintenance of the machine sold."

Study Reveals Low Profit Level

Data which reflected the low profit level of the industry as a whole were interestingly presented by

General Manager E. F. Du Brul at the last session of the meeting.

The data presented were from a tentative study of "Machine Tool Sales and Profits, 1919-1926." The study was made from the reports of 24 unidentified companies of a size that represented the bulk line of production. United States Census figures were said to show that over 80 per cent of the output of the industry is made in shops doing more than \$100,000 annual business, and about 69 per cent of the volume is produced in shops doing \$1,000,000 or more annual business.

The 24 reports used show average sales of over \$1,000,000 per year per company for the period under review. The reports are also considered as representative samples because the trends of sales figures check reasonably well on their face with the trend of the business by years, shown by the association's barometer reports. They also check reasonably well with trends shown by the United States census of manufactures, taken every two years. The showing of this group is also regarded as representing more than average efficiency, because they are all survivors of the hard times that put so many other companies out of the machine tool business.

The data of the whole period is divided into two sub-periods of four years each,—the years 1919-1922 representing the abnormal boom and slump period, and the last four years being taken as a more normal present condition.

It was brought out that 50 per cent of the reporting group's sales for the last four years sold either at a loss or a very small profit and that profits of the other 50 per cent were quite modest.

Discussion of this report resulted in the following resolution: "Resolved that in view of the showing of this study, it is the opinion of the National Machine Tool Builders Association that the level of profit of the industry as a whole is insufficient to permit the industry to give its customers the research and engineering their own interests demand, nor to maintain the personnel of the industry on the scale of wages and salaries paid for men of similar skill in other industries.

Urges Constructive Cooperation

Constructive cooperation was urged in a forceful address made by Col. L. S. Horner, president Niles-Bement-Pond Co., New York, at the second session, Oct. 11.

It was pointed out that the available manufacturing capacity of the machine tool industry, like many others in the country, is in excess of the demand for its products.

"This condition results," he said, "in a price level so low that sufficient profit is not being made to keep our industry strong and healthy. We cannot appropriate sufficient funds to carry on engineering research and improvement in design which our customers have



New Members of the Board of Directors of the National Machine Tool Builders Association: (from Left to Right) J. E. Andress; H. E. D. Gray, and H. W. Dunbar

a right to expect, and for which they are, I believe, willing to pay if we intelligently do our part. We are a basic industry, are entitled to a fair margin of profit, and can secure it if we adopt sound economic policies."

The responsibility which executives should feel for their industry was stressed. On this Colonel Horner said: "We all recognize responsibility to stockholders, employees and the community in which we live, but few honestly believe they have equal responsibility to their industry, and that individual executive policy detrimental to the whole industry reacts on their own success to a large extent." Knowledge of true costs was one item of executive responsibility stressed.

Col. Frank A. Scott, president Warner & Swasey Co., Cleveland, in his discussion of Colonel Horner's address pointed out that "we have in this country 50 per cent of the world's steel production and 50 per cent of the machine tools. The metal-working industries in the United States are better equipped than any other in the world. We have 40 per cent of the world's railroads and more than 50 per cent of the telephones, for less than 120,000,000 people, or a small fraction of the world's population. This is a metal age, he said, and what the machine tool builders and their predecessors have done has made possible this supremacy."

Approve Standards Relating to Initial Speeds of Machine Tools

RECOMMENDATIONS relating to the standardization of initial speeds of machine tools were submitted by the general committee on technical standards, which is headed by A. L. Stewart, chief engineer Gleason Works, Rochester, N. Y.

Data charted from replies to a questionnaire sent to the association's membership were presented. The speeds proposed as standard are 300, 400, 500, 600 and 800 r.p.m. The standards for motor speeds for machine tool drives are 1200-1800 r.p.m., and the proposed standard dimensions for machine pulleys are 8, 10, 12, 14, 16, 18, 20 and 24 in. The motor speeds and machine speeds proposed would result in the following ratios between motor and machine: 1.5; 2; 2.25; 3; 3.6; 4; 4.5; and 6. The speed of grinders is not included in this recommendation.

The recommendations of the committee were approved at the meeting. The committee is also working on standards for belt pull, handwheels and paint colors.

Interesting reports were made by the cost accounting committee, which was represented by Arlo Wilson, Niles-Bement-Pond Co., New York. T. B. Frank, treasurer Cincinnati Planer Co., Cincinnati, spoke at length on depreciation practice.

Cultivation of Export Business Urged

Active cultivation of export business was urged in the report of the Department of Commerce committee, which was presented by J. E. Andress, president Barnes Drill Co., Rockford, Ill. It was pointed out that

export business cannot be had on the spur of the moment but has to be cultivated in advance.

The dealers' relations committee, headed by J. Wallace Carrel, vice-president Lodge & Shipley Machine Tool Co., Cincinnati, also submitted a progress report. There has been close cooperation between this committee and a similar committee of the Associated Machine Tool Dealers. Subjects being discussed include the form of agency contract, contracts between users and sellers, etc.

A number of resolutions were presented by the resolutions committee at the last session of the convention, Oct. 13, which took the form of round table discussion. Favorable action was taken on the creation of a traffic committee, to be made up of five members, and also on the creation of a general accounting committee, which was referred to the board of directors. Standard practice of including definite charges for erecting and service men in contract of sale was another matter referred to the board.

Standing of Machinery Builders in State Courts

A court decision of basic importance to machine tool builders, as well as to other manufacturers who give service on mechanical devices in use in a number of States, was also brought up at the final session of the meeting.

The case in question involves the New Britain Machine Co., New Britain, Conn., one of whose demonstrators was involved in an automobile accident in Ohio. Under the ruling of the Federal Circuit Court of Appeals any company giving service on machines that have been sold and paid for in a given State is doing business in that State.

The point of interest is that machine tool builders are without standing in the State courts, apart from those of their home State, unless they are licensed to do business in the 35 or 40 States in which they may be giving service. It was pointed out that such manufacturers cannot collect accounts through the courts, and are subject to fines if they give service. The matter is now before the United States Supreme Court.

H. H. Pease, president New Britain Machine Co., outlined the principles involved in the case. The giving of financial as well as moral support to the New Britain company was suggested by members of the association, and the matter was referred to the board of directors with authority to act.

Castings for Machine Tools

Difficulties encountered in machining cast iron containing more than 0.30 per cent phosphorus were outlined briefly in an address by E. A. Muller, president King Machine Tool Co., Cincinnati, in an address on "Better Castings for Machine Tools."

Investigation of the subject by Mr. Muller was begun about two years ago following an experience with castings that tested satisfactorily as to hardness and strength but which were unusually difficult to machine. One casting, of lowest scleroscope hardness, was found to be the most difficult to machine. This was accounted

for by the crystal formations known as Steadite, occurring in castings of more than 0.30 per cent phosphorus. This was said to be particularly objectionable where steel mixtures are made.

For heavy castings such as beds and rails, the following analysis was recommended: Silicon 1.10 to 1.20 per cent; manganese, 0.50 to 0.60; phosphorus, 0.25 to 0.35; sulphur, 0.08 to 0.10; and total carbon, 3.25 to 3.35 per cent. For lighter work, castings of the same composition, but containing from 1.40 to 1.60 per cent silicon, were recommended.

Membership Increasing

The association has 121 members. The following seven companies have applications before the association: Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.; Logansport Machine Co., Logansport, Ind.; Micro Machine Co., Bettendorf, Iowa; National Acme Co., Cleveland; New Britain Machine Co., New Britain, Conn.; Seneca Falls Machine Co., Seneca Falls, N. Y.; and the Torrington Co., Torrington, Conn.



C. C. Swift (at Left) and A. H. Tuechter (at Right), Members of the Board of Directors

Committee Reports on Undersea Corrosion

British Civil Engineers' Findings on Protected and Unprotected Steel —New Zealand Results on Ferroconcrete

A COMMITTEE, appointed by the British Institution of Civil Engineers to investigate the deterioration of structures in sea water, and which has been carrying out extensive researches into this subject since 1916, has just issued its seventh interim report.

Unprotected Iron and Steel

Regarding the corrosion of unprotected iron and steel, the report describes the results found on inspections during 1925 of four series of samples to be examined for 5, 10 and 15 years' immersions, each group in triplicate for exposure aerially, at half-tide, and fully immersed, in the harbors of Colombo, Halifax, N. S., Plymouth, and Auckland, N. Z. The 5-year group also included samples consisting of groups of dissimilar metals placed in contact in various ways.

The results show only one material—medium carbon steel low in sulphur and phosphorus—that was badly corroded in all circumstances, and none that resisted corrosion very well in all circumstances, although a 36 per cent nickel steel and a proprietary non-corrosive steel seemed to resist it very well, or well in most circumstances.

The one result that seems to be clear is that the attack is of different severity in different waters. An interesting example is given by E. J. McKaig and Dr. J. Newton Friend of some mild steel lattice girders in the approach to a landing stage at Weston-super-Mare, England, of which parts had been corroded to a loss of over one-half of their weight, but others to a far less extent, or in some areas not at all. The girders had been exposed to occasional spray during 20 years, but are sheltered, while the corrosion is far greater than that of the landing stage itself, which is of similar material. No probable reason can be assigned for the irregularity, but it is conjectured that it must lie in the circumstances of the initial painting, and notably in the fact that the painting was done at the same time as the riveting, when the material around the rivets, which is unattacked, was warm.

Results on Preservative Coatings Irregular

On the question of the efficiency of various preservative coatings, Doctor Friend reports at length the results of exposing 330 mild steel plates in Southampton Docks. The plates were kept under cover for 10 months after coating to allow the coatings to harden, and were then exposed for a year in three sets, respectively fixed on a roof exposed to sea air, between high and low water levels, and completely submerged. At the end of the year the first set was not corroded sufficiently to

make it desirable to interrupt the exposure, but the other two sets were dismantled and the loss of weight and depth of pittings determined.

The results as between individual weights were more or less irregular, but a table shows the average losses and the maximum depth of pit for each composition. Taking two coatings of iron oxide paint on pickled and cleaned surfaces as the standard coating, the weights lost on alternate wet and dry exposure are varied from 6 per cent for a solution of bitumen in naphtha to 148 per cent for plates with the scale on and two coats of iron oxide paint.

Some Results on Ferroconcrete

The committee has received from J. Marchbanks, chief engineer of the Wellington Harbor Board, New Zealand, data regarding the exposure for seven years of two ferroconcrete piles 10 ft. long, with the reinforcement so placed as to give depths of cover 1 in., 1½ in., 2 in., and 2½ in. respectively, the lowest 2 ft. being always submerged, and of the remainder half being subject to the rise and fall of the tide and the other half above water level.

A thorough examination, removing a length of cover, has shown the pieces to be perfectly sound and everywhere free from rust. The cover has been repaired where stripped, and the exposure is being continued, in the hope of ultimately obtaining data as to the protective value of increased depth of cover.

Early Writings on Simplification

As early as 1875 the late Prof. John E. Sweet, then at Cornell University, and one of the founders five years later of the American Society of Mechanical Engineers, wrote a book on machine shop practice. One statement quoted by the Division of Simplified Practice of the Department of Commerce read as follows: "In no part of machine shop practice do the advantages of a uniform standard of sizes show themselves so frequently as in the use of bolts and nuts." Bolts and nuts furnished one of the early points of attack for the present simplified practice movement.

The steel frame of a three-story building on Fourth Avenue, Huntington, W. Va., was erected in three days by James J. Weiler & Sons, 202 Elm Street, that city, according to an account in the *Huntington Advertiser*, which explains that the building has a frontage of 76 ft. and a depth of 150 ft.

Tests of Two Industrial Locomotives*

Two years ago a prominent industrial locomotive builder constructed for a large copper interest three 30-in. gage 15-ton locomotives of an entirely new design, although based on an old principle. These locomotives dispensed with any mechanical means for reversing. The steam for each cylinder was distributed by a piston valve operated through a single eccentric. The valves were situated between the cylinders under the saddle. Between these valves and directly under



In This Industrial Locomotive Piston Valves Between the Working Cylinders Are Used for Reversing

the center of the exhaust nozzle was a piston valve connected to the reverse lever. The steam from the boiler to this valve is controlled from the throttle in the usual manner.

In principle the distribution and operation of the

*Contributed by A. W. Carroll, Hastings-on-Hudson, N. Y.

engine is similar to the Crane engine familiar to old-time steam engineers, only that in the case of the locomotive, the throttling is not done by the reverse valve but by an independent throttle, the reversed valve being in the maximum forward or backward position. No cut-off economies are possible with this arrangement, but as stated before, this practice is not in use on industrial locomotives, and seldom in railroad yard service; and is therefore not necessary to be considered.

The three locomotives thus equipped have been found ideal for industrial purposes, as after a year and a half of the severest service, no repairs or replacements of the valve gear have been required, and, there being no lost motion, the maximum pulling power has been maintained at all times; and in addition, the piston valves have remained absolutely tight.

A most carefully conducted test extending over a month was made between two new locomotives of identically the same weight, one fitted with the new valve gear and one with the Stephenson, to determine what, if any, difference there was in their performance under the same conditions. The attached tabulation shows what a small difference there was. Indicator cards from both engines were taken at frequent intervals on various loads and were almost identical.

Comparative Tests of Two Industrial Locomotives

	Stephenson Locomotive No. 8	New Type Locomotive No. 9
Total tons hauled.....	57,770	56,905
Total cars moved.....	9,825	8,790
Total miles.....	499.3	498.8
Total pounds fuel.....	22,955	23,996
Total tank fillings.....	69	67
Total gallons water.....	26,392.5	25,627.5
Total hours working.....	278.5	275
Tons per mile.....	115.70	114.08
Pounds of coal per ton....	0.397	0.421

Chart for Forged Steel Flange Design

Aid to the engineer concerned with the design of forged steel flanges for piping, tubing, pressure vessels, tanks, penstocks, etc., has been published by the American Spiral Pipe Works in the form of a set of charts. These permit a graphical solution of the new Waters formula for the design of any plain or hub flange from 4 to 100 in. in diameter.

Determination of stress on pipe flanges under working conditions has been a difficult problem with engineers and designers of high-pressure piping. At a meeting in New York some years ago, at which practically every line of industry was represented, an attempt was made to formulate standards. It was found that, while a few engineers had a fairly clear idea of methods of stress determination, there was such wide variation of opinion that further research and data seemed advisable.

Prof. E. O. Waters of Yale University developed from the theoretical standpoint a formula which checked accurately with results obtained on testing machines. A paper on this work was read last May at a meeting of the American Society of Mechanical Engineers. Tests conducted during 1924 and 1926 included flanges of both standard and special design. These tests afforded a check on the correctness of the formula and developed considerable data on the effect of hubs on the strength of flanges.

As a great many variables are present in flange design, the formula evolved was necessarily complicated. Hence a series of graphical charts was prepared from which, by direct reading, the stresses in flanges may be determined without necessity for mathematical solution of the complicated formula. The charts are in two sections, the first covering plain ring flanges from 4 to 40 in. and from 40 to 100 in. in diameter. The second section covers stresses in high or low hub forged steel flanges from 4 to 100 in.

The charts are available to engineers by addressing Taylor Forge Division, American Spiral Pipe Works, Box 485, Chicago. A reprint is available also of the paper presented at the May meeting of the A. S. M. E., which contains results of the investigations, with detailed explanation of the data developed and methods used in conducting tests, as well as the recommended proportions for both flat ring and hub flanges.

New Electric Dial Scale

Rapid operation and unusual accuracy are claimed for a new electrical dial scale of the Standard Scale & Supply Corporation, Pittsburgh.

The electrically-operated poise automatically strikes a balance and the compensating beam gives the combined net gross and tare weight reading at a glance. The weight is indicated to a split-pound figure through an electrically lighted dial window. It is claimed that an operator can accurately weigh 200 loads per hr. continuously. Accuracy of 1-70 of 1 per cent of the total capacity is obtained, which unusual accuracy is said to



Accurate Weighing at Rate of 200 Loads an Hour Is Claimed

be due to the compensating beam and to the fact that the load on the platform does not do the work of turning the mechanism.

This scale is adaptable to any type of heavy-duty beam scale by placing the electric dial on the beam shelf after removing the old fixtures. A welded steel column can be furnished if desired. Compensation for change of level is a feature stressed, this compensation being continuous over the entire dial reading.

Automatic Chucking Machine for Work Up to 10 $\frac{7}{8}$ In. by 10 In.

An 11 x 10 in. four-spindle automatic chucking machine of the same general construction as its 6 x 6 $\frac{1}{4}$ in. automatic has been brought out by the Goss & De Leeuw Machine Co., New Britain, Conn.

The machine is intended for work up to 10 $\frac{7}{8}$ in. in diameter and 10 in. long. The cutting tools revolve, and the work is held on the turret and fed against the tools. Two-jaw chucks are generally used, but three or four-jaw universal chucks can be furnished, as well as special fixtures and draw-back arbor attachments. Rapid and accurate production in turning, boring, drilling, reaming, facing and threading operations are claimed. Oil grooving, either straight or spiral, and light broaching can also be done.

Work for which the machine is particularly adapted includes end covers of fractional horsepower motors, door check casings, valve fittings and bodies up to 3 $\frac{1}{2}$ in. size, the heavier class of automobile parts, electric drill casings, air brake and railroad parts. The return stroke of the feed cam, the index time, the advance stroke of the turret, up to the feeding section, as well as the speed of the coolant pump remain at a constant speed regardless of the speed at which the machine is operated.

The drive to tool spindles Nos. 1, 2 and 3, which have large bearing surfaces, hardened and ground, is through individual change gears. In setting up, the operator selects the speed best suited for each spindle or tool, and uses the gears that will give the desired speed. In addition to the individual spindle change gears, the machine is equipped with a set of main change gears by means of which the speed of Nos. 1, 2 and 3 spindles can be increased for brass work, or decreased for harder material such as cast iron, steel, etc.

All threading operations are accomplished with the No. 4 spindle, which is mounted in a separate threading slide. Threading operations are controlled by the company's patented lead screw arrangement. These lead screws and nuts may be changed quickly for various pitches. Both inside and outside threads of different pitches can be cut at the same time. When the machine is threading the threading slide and the turret slide are locked and move together. The front threading spindle also has large bearing surface, and is fitted with a large flange with pilot hole and cross key for attaching, locating and driving the die heads used on the larger class of work. The threading spindle is also fitted with a large safety clutch which is intended to protect the threading tools should the tap or die bottom in the work because of incorrect setting. The threading spindle is driven through compound change gears and an added change is accomplished by a sliding back gear which further reduces the speed by 2 $\frac{1}{2}$ to 1, so that when the threading spindle is geared for the largest tap within the capacity of the machine, the total back gear reduction from the driving shafts to the threading spindle is 20 to 1. The machine will thread up to 3-in. pipe tap in iron or 3 $\frac{1}{2}$ -in. pipe tap in brass.

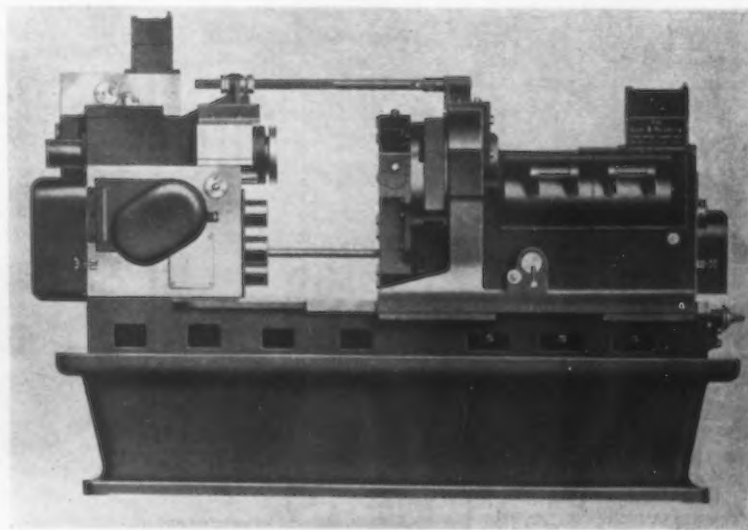
The turret and turret slide are fed by a cam and move forward and backward as a unit. The index of the turret is by a Geneva stop motion. The turret is positioned by a locking bolt which is flat, hardened, and moves between a hardened plate and a hardened taper gib. It acts on slots which are accurately spaced in the Geneva wheel. The latter is bolted to the turret, which construction is intended to eliminate any torsion or twist. The working face of the turret is 28 in. in diameter and when indexed it turns in a 20-in. diameter bearing in the front of the slide.

The cam drum is mounted in the slide and is used only for the feed and return of the turret slide. This makes the diameter of the cam as small as possible and eliminates idle space on the drum, the cam using all but 1 in. of the entire circumference. The cam stands still

while the indexing takes place. The mechanism for these two functions is interlocked. Feed cams are interchangeable, so that different feed strokes may be quickly obtained.

The cam roller is mounted on a slide between the main ways of the machine and is locked to the bed during all machining operations. The positioning of this slide accurately locates the turret. A screw with a micrometer collar acts directly on the roll slide, which arrangement is intended to assure accurate adjustment. This feature is of special value when accurate facing must be done; it also permits the rapid final adjustment of the work after a trial cut has been taken.

A safety attachment has been incorporated in the machine to give confidence to the operator and to make it possible for one man to operate two or more machines. As soon as the operator completes the placing of the work in chuck he trips a hand lever in the loading position and the indexing can then start when the return of the slide is completed. The lever can be moved as soon as the work is placed, and the machine will not stop unless the operator has consumed more time than allowed by the machine cycle. A universal



The Capacity Is for Work 10 $\frac{7}{8}$ In. in Diameter and 10 In. Long. The cutting tools revolve and the work is held on the turret and is fed against the tools

cross-cut attachment can be supplied for handling such operations as necking back on threads, light forming operations and single point-facing operations. An electric chucking and unchucking device can be furnished. The machine is arranged for motor drive only, the motor being mounted on a separate base apart from the machine. The drive is through silent chain. To facilitate setting up, the machine is fitted with hand feed, the operator using a crank handle wrench for this purpose. Power feed can be thrown in or out at the front or back of the machine. A 10 or 15-hp. 1200-r.p.m. constant-speed motor is recommended. The length of the machine is 108 in. overall, and the width is 48 in. The weight net is 13,000 lb.

The consistency of vitreous enamel slips has been investigated by the United States Bureau of Standards. An enamel slip is composed of a white or colored ground glass, suspended in water by the help of clay. This suspension is sprayed or otherwise brought upon the surface of metal shapes, the water is allowed to evaporate, and the glass is then melted, forming a hard, glossy coating over the metal.

The August, 1927, output of Portland cement represented approximately 94.4 per cent of the capacity of the plants for that month and the production for the first eight months of the year was 75.2 per cent of the capacity available during that period. Corresponding figures for September and for the first nine months of the year are 92.2 per cent and 77.2 per cent, respectively.

Traversing Reel Spools Wire from Rolling Mill or Drawing Machine

A traversing reel designed for use in spooling wire as taken from a small rolling mill or wire drawing machine is shown in the accompanying illustration.

The spool on which the material is being wound is caused to traverse back and forth by means of a train of gears, an adjustable eccentric disk and a nut which is operated by ratchets and pawls. This mechanism is driven by the spool shaft and therefore it coils the



The Traverse Motion Reverses Instantly, Eliminating Building-Up of the Wire at the End of the Spool

wire evenly regardless of the progressively increasing diameter of the spool. The amount of traverse per turn of the spool can be varied at will by adjusting the eccentric disk. The traverse motion reverse may also be adjusted at the ends of the spool to suit various diameters of wire. This traverse motion is said to reverse instantly to eliminate building up of the material at the end of the spool and to assure a compact package which will readily unwind.

These reels are built by the Standard Machinery Co., Auburn, R. I., in two sizes which cover a range from very small wire or flats up to diameters or widths as large as 9/16 in.

This device was shown at the New Haven Machine Tool Exhibition, held at New Haven, Conn., Sept. 7-9.

Hand-Operated Angle Iron Shear

The Whitney Metal Tool Co., Rockford, Ill., has placed on the market an angle iron shear which has capacity for material up to 3 x 3 x 1/4 in. This machine, designated as the No. 62, is similar to the company's No. 4 angle iron shear, but is of heavier type.

This shear is equipped with an eccentric gear so that leverage is equally distributed over the entire cut-



Material Up to 3 x 3 x 1/4 In. May Be Sheared

ting blades, and an adjusting screw provided so that angles can be cut off square. A self-clamping pad is employed for holding angles in position and a flat bar handle, milled to fit the socket, is furnished with the shear. All wearing parts of the machine are hardened.

Bench-Type Gear Hobbing Machine

The Triplex Machine Tool Co., 50 Church Street, New York, has placed on the American market the Mikron No. 79 bench type gear and pinion hobbing machine here illustrated, which is for hobbing gears and pinions up to 1 1/2 in. diameter and in lengths up to 1 1/2 in. It is used for hobbing brass and steel gears of water and other meters, clocks, watches, etc. By using change gears, gears having from 6 to 500 teeth may be cut.

All gears in the machine are completely inclosed and the change gears are made accessible by removing the cover plates. The pieces to be cut are held on an arbor during the cutting operation, and a spare arbor is utilized so that gear blanks to be cut will be ready for quick mounting in place of those being cut in the machine. The feed of the hob can be varied to suit the material to be cut, the change gears allowing a variation of 0.004 in. to 0.030 in. per revolution of the work. The hobs used are the backed-off type, to facilitate re-



The Capacity Is for Gears and Pinions Up to 1 1/2 In. in Diameter, 1 1/2 In. Long

sharpening. The machine is provided with an aluminum oil reservoir, filter and pump for cutter lubricant. The approximate net weight of the machine with countershaft is 125 lb., and the bench space required is about 20 in. x 22 in.

Would Make Wearing of Goggles in the Shop Mandatory

A mandatory ruling requiring every employee in an industrial shop to wear goggles while at work was advocated by Harry Guilbert, director of safety Pullman Car & Mfg. Co., in an address in Chicago, Oct. 14, before a joint session of the National Safety Council and the National Committee for the Prevention of Blindness.

In Pennsylvania alone, he said, the sight of 6842 eyes has been completely destroyed in industrial accidents since 1916. From Jan. 1, 1927, to date 383 eyes have been made useless through accidents in the industries of Pennsylvania ranging from coal mining to restaurant work. In one year the employers of Pennsylvania paid more than \$800,000 in compensation for eye injuries and this represents a total economic loss of close to \$5,000,000. The employers of New York State paid \$1,700,000 for eye accidents last year.

The Central Supply Co., Inc., 838-56 Main Avenue, Passaic, N. J., will hold its second annual exposition, featuring factory, heating and plumbing supplies, on Nov. 16 to 19.

Industrial Gas Discussed at Chicago

Operating Conditions and Costs Cited — Non-Ferrous

Metal Losses — Many

Exhibits Shown

PROBLEMS involved in meeting the rapidly increasing demand for gas attracted 5000 delegates representing 650 natural and manufactured gas operating companies to the ninth annual convention and exposition of the American Gas Association, which was held Oct. 10 to 14, at the Stevens Hotel, Chicago. Exhibits by manufacturers of equipment and appliances numbered 250.

Heating, preparatory to forging operations, was discussed in a paper by William M. Hepburn, vice-president Surface Combustion Co., New York. A typical fuel comparison between gas and oil-fired forges of the ordinary type was given in the table that follows:

	Gas	Oil
Size of stock heated..	¾ in. sq.	¾ in. sq.
Number of bars per heat	15	15
Temperature of work	2200 deg. Fahr.	2200 deg. Fahr.
Dimensions of heating chamber	24 in. wide 18 in. deep	24 in. wide 18 in. deep
Weight per forging..	0.835 lb.	0.825 lb.
Average output per shift (test)	3075 lb.	3034 lb.
Maximum output of any one shift.....	3680 lb.	3680 lb.
Fuel consumption per lb. steel	3.9 cu. ft.	0.02 gal.

The continuous type of furnace was said to be capable of heating to forging temperature at the rate of 75 lb. of metal per sq. ft. of hearth area. These units are semi-automatic, the pusher being so timed that the work is pushed through and discharged in the prescribed period. Automatic temperature controls maintain the temperature constant, regardless of the rate of production. The firing equipment is of the automatic proportioning type, whereby the atmosphere in the heating chamber is maintained slightly reducing. The combustion zones are so located that heat is applied to the work from both above and below. The savings in operating costs were illustrated by the table of cost comparison between four oil-fired forges and one continuous gas-fired furnace which replaced them.

COMPARISON OF OPERATING COSTS

	Four Oil-Fired Furnaces	One Continuous Gas-Fired Furnace
Fuel—		
Production	\$4,655.00	\$3,476.00
Heating up	900.00	350.00
Standby losses		
Labor	76,800.00	58,800.00
Maintenance	1,000.00	350.00
Steam, light, power.....		
Die life		
Increased production		
Fixed charges—		
Hammers (4)		
Presses	64,000.00	48,000.00
Re-strike hammers		
Floor space	6,000.00	4,800.00
Overhead		
Total (not considering items left blank)...	\$153,355.00	\$115,776.00
Anticipated yearly savings		37,579.00

These figures were based on the following premises:

- 2,257,000 lb. of stock a year (1400 pieces of stock, weighing 6.45 lb., each 16-hr. day, 250 days a year).
- Fuel for production—Oil, 55 gal. a ton; gas, 5500 cu. ft. a ton.
For heating up—Oil, 1½ hr. 4 furnaces—8 gal. an hr.; gas, 1½ hr. 1 furnace—2500 cu. ft.
- Cost of oil—7½c. a gal.; of gas—56c. per 1000 cu. ft.
- Labor, with oil—4 drop forgers at \$1.50 an hr.; 4 heaters at 90c. an hr.
With gas—4 drop forgers at \$1.50 an hr.; 1 helper at 90c. an hr.; ½ furnace leader at 90c. an hr.
Direct labor overhead, 100 per cent.

Regardless of whether the units are under production the full term of 250 days a year, the labor, fuel and maintenance are relative to the time the units are in production. The possible savings of 30 per cent or more in fuel and the elimination of labor are only two items that justify the development. The unit, being under full automatic temperature control, can be operated at 50 per cent of capacity and practically the same ratio of savings will be maintained. When operating with two drop forgers, the helper required for removing the flashing can be eliminated.

Gas Used in Non-Ferrous Work

Metal losses under the most favorable conditions in non-ferrous fuel-fired furnaces were shown by the following table, which formed a part of a paper on "Gas Economies of Brass Melting," by J. F. Quinn, Brooklyn Union Gas Co., Brooklyn, N. Y.:

Composition of Alloys in Per Cent				Metal Loss from New Metal, Per Cent	Metal Loss from Borings and Filings, Per Cent
Copper	Zinc	Tin	Lead		
88	2	10	0	1.0	1.5
85	5	5	5	2.0	2.5
80	10	5	5	2.25	3.0
75	16	3	9	2.75	4.0
67	32	0	1	3.5	5.0
60	40	0	0	4.0	10.0

In ordinary practice, however, the loss is greatest in the direct-fired type. This is due to the larger area of metal surface exposed to the application of heat at the upper surface of the metal. One of the factors assisting in the maintenance of low metal losses in a certain induction-type electric furnace is the application of the heat within the metal itself and at the bottom of the crucible. The metal losses in the various arc-type electric furnaces, in which the heat of the arc is liberated just above the surface of the metal, are as high as the metal losses in gas-fired crucible furnaces.

Frederick W. Sperr, Jr., research director Koppers Co., Pittsburgh, was presented with the Beal medal in recognition of his contribution to gas engineering. Mr. Sperr has been twice the recipient of this award.

Oscar H. Fogg, vice-president Consolidated Gas Co., New York, was elected president of the association. He succeeds Alexander B. Macbeth, vice-president Southern California Gas Co., Los Angeles. Bernard J. Mullaney, vice-president Peoples Gas Light & Coke Co., Chicago, was elected vice-president, and Clifford E. Paige, vice-president Brooklyn Union Gas Co., was reelected treasurer.

Statistics of the production activity of the Newcastle Steel Works of the Broken Hill Proprietary Co., Ltd., Australia, indicate that over the fiscal year ended May 31, 1927, a total of 343,801 gross tons of pig iron and 353,682 tons of steel ingots were made by that company, says a report received by the Iron and Steel Division, Department of Commerce, from Consul R. L. Rankin, Newcastle. These totals compare favorably with the returns for 1925 and 1926 when 358,861 tons and 333,025 tons of pig iron and 331,137 tons and 323,518 tons of steel ingots were made, respectively.

Orders received by the General Electric Co., Schenectady, N. Y., for the three months ended Sept. 30, amounted to \$77,420,263, compared with \$81,587,917 in the corresponding quarter of 1926. In the first nine months of 1927 orders totaled \$233,076,091, a decrease of 6 per cent from the \$246,993,637 in the first three-quarters of the preceding year.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently
of Trade Opinion, Indicate That:

Steel ingot output has dropped below normal, but a further decline is anticipated before recovery begins.

Unfilled orders must be well "deflated," indicating that little further decline may occur.

While too much pig iron has been produced so far this year, the index has now fallen below normal, but it still is large in comparison with ingot output.

Commodity prices have had a slow upward movement for two months, which may carry steel prices along before the year ends.

AS expected, and as forecast in this department, it has been found necessary to curtail steel production further. In September, the ingot output fell below our estimate of normal for the first time in over two years. Allowing for the normal growth of the industry and for the usual seasonal variation from month to month, this represents the lowest annual rate of production since November, 1924. It is the first time since that date that our production curve has fallen below the level of the steel price curve.

Usually, in September, steel production increases by about 5 per cent, but last month there was a decrease, making the usual allowances, of about 7 per cent. Accordingly, a sharp net decline is shown by the adjusted index, which fell from 105.8 per cent of normal in August to 93.3 per cent. In other words, September steel production was nearly 7 per cent below our estimate of the country's normal requirements (including exports). This is the sharpest decline since June, 1924.

It is true that steel production declined in September last year, also, and that it failed to make the usual seasonal gain in September, 1925. This year, however, the decline in the adjusted curve is much sharper than in the earlier periods and carried to a lower level.

Moreover, present indications are that production in October will fall behind the normal expectations for that month.

Cyclical Movement Apparent

It now looks very much as though this represents a cyclical decline. Steel reached a "bottom" in 1921, again in 1924, and the usual period of about three years would be fulfilled if the low point in the present decline should come before the end of this year. This would be consistent with our experience with cycles in the steel industry. Of course, it should be noted that, if this has been a major decline in the steel cycle, it has been going on since August, 1926. *That fact is encouraging as to the future.* The place to look for recovery is near the bottom.

There has already been a general declining trend for about 13 months and it will be remembered that the descending phase of the cycle that began in May, 1923, lasted only 14 months. Furthermore, there has been no such excess production as existed in 1923: the peak has not been so far above normal, and production has been better adjusted to requirements, as has been shown all along by its relation to our composite demand

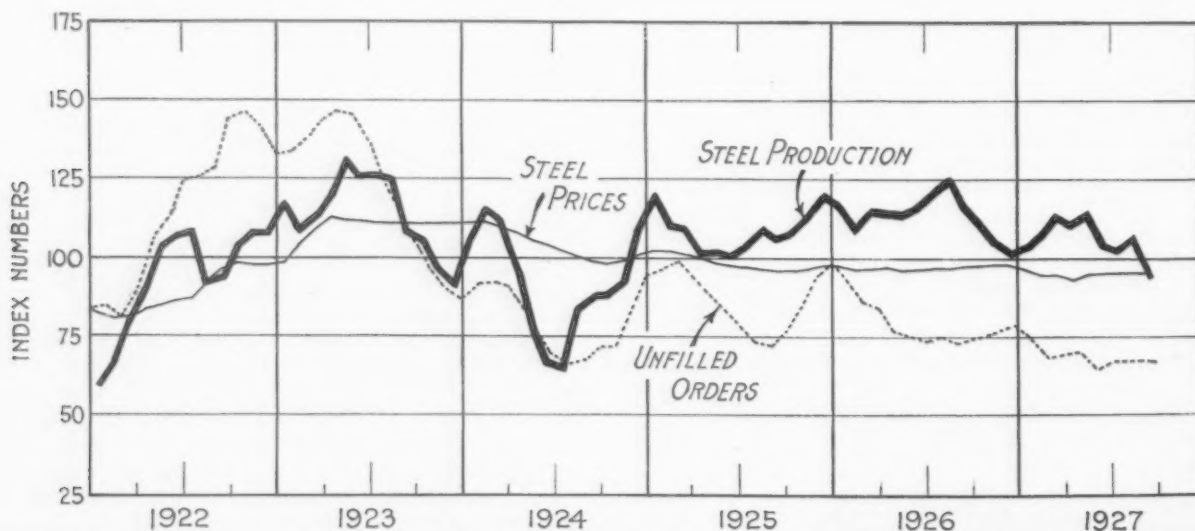


Fig. 1—Steel Production Has Dropped Below Normal, but Apparently the Bottom Is Still Ahead. Prices, while slowly sagging, have changed only slightly for months. Unfilled orders have reached and held an unusually low level

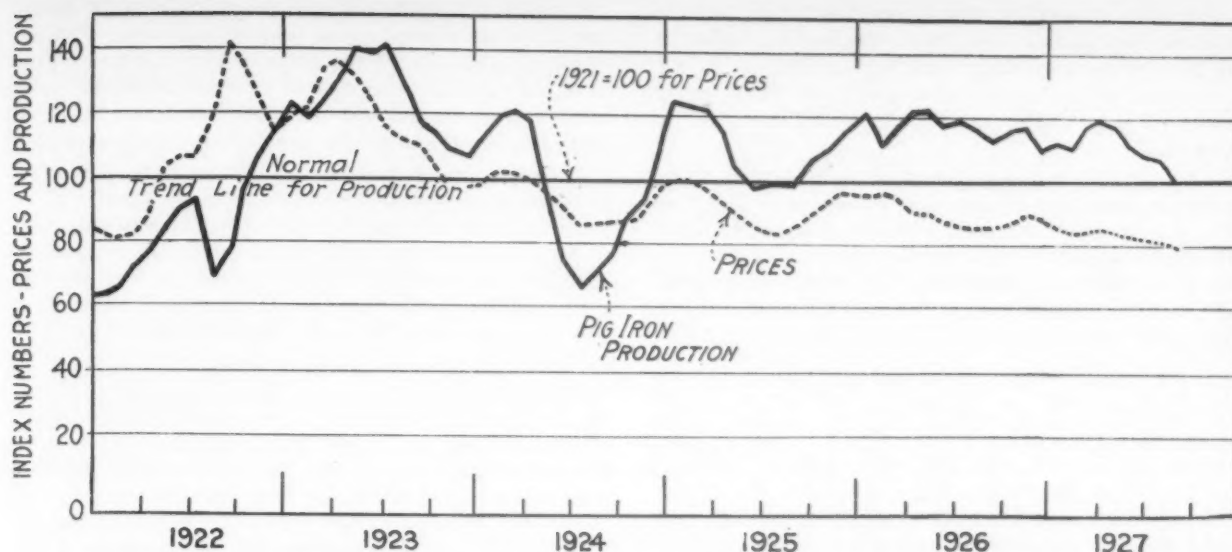


Fig. 2—Reduced Output and Continued Drop in Prices of Pig Iron May Give Way to Irregularity in Both Elements. But any recovery in the pig iron market must await developments in steel

line. The fact that price levels are so low and obviously near bottom levels is significant also.

Prices Lowest in Five Years

THE IRON AGE composite index of finished steel shows an average for September of 2.357 cents, against 2.367 cents in August. With the exception of April, this is the lowest monthly average of the year and the lowest since 1922. At the present writing the figure has fallen to 2.331 cents. Now that production is below normal and that the general level of commodity prices is rising, it seems fairly clear that only a relatively short time can elapse before the market gains strength.

It must be admitted that an upturn does not seem at all probable in October, as we had previously anticipated. The weakness in fuel and pig iron prices, the slackness in the automobile and railroad fields, and the absence of forward buying, are sufficient indication of this. Indeed, conditions would be following good precedent if a further decline in production (considering the season) were sustained before steel prices rise.

Unfilled orders of the Steel Corporation have held unusually steady during the last four months. In view of a downward trend in production (and presumably in shipments), however, this is not encouraging. There must have been a pronounced decline in orders during September. But it can be said that unfilled orders are thoroughly "deflated" and that stocks must be small, so that not much further decline is probable or possible. This suggests another reason for not expecting any large further decline in production, for, since out-

put is so closely in line with current requirements, there will not be much need of liquidating stocks. This may well soften if not prevent the final break in prices which often comes when the market is "tested" at the end of a recession in the industry.

Pig Iron Below "Normal," Also

AS in the case of steel, pig iron production decreased sharply in September and fell below our estimate of normal for the first time in two years. According to our estimate of the line of normal growth, or "trend," the September output of 2,775,000 tons was only 98.4 per cent (uncorrected for "seasonal" influences). More than this, September should normally show an increase over August of about 1 per cent, whereas there was actually a decrease last month. Our final adjusted index registered 99.2 per cent of normal against 106.4 per cent. Thus it is less than 1 per cent under normal. This leaves pig iron production relatively great in comparison with the ingot output and, until either steel production picks up (as is not likely in October) or pig iron production is curtailed further (as is more probable), no strength is to be expected in the pig iron market.

THE IRON AGE composite price in September averaged \$18.03, which compares with \$18.13 in the preceding month. A week ago it was \$18.09. Thus some recovery is indicated, which is as we have been suggesting for October. It seems doubtful, however, if much progress on the upside is yet in prospect. Further irregularity is to be expected. Iron production is

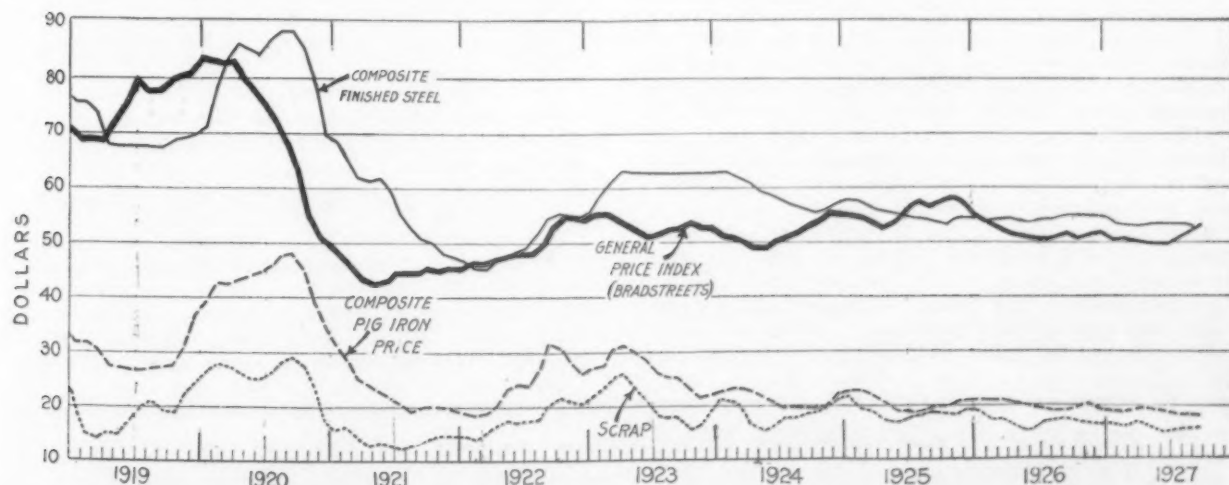


Fig. 3—For the First Time in Two Years, the Finished Steel Price Index Has Fallen Below the General Commodity Level. Following the past relation between the two, steel prices ought to turn upward before the break of the year. Pig iron may follow

too large in comparison with the make of steel, and the coke market is too weak. Nevertheless, the price of pig iron is certainly near rock bottom and it is only a question of a few months before the next major movement is probable—and it will almost certainly be upward.

The same cycle shown by steel production is to be found in the curve of pig iron production. The true peak in the case of pig iron probably occurred in April 1926, although production was temporarily at a higher rate in January and February, 1925. Since early 1926, the trend has been downward for a period of 17 months, with only a temporary recovery in the spring this year.

Steel Prices Due for a Rise

PERHAPS the most notable point in the steel price structure this month is the decline in the spread between bars and billets, that spread being now the smallest since November, 1922. It seems clear that before long either bars must move up or billets move down, as the margin between them is abnormally small.

In reasoning about the situation, one notes first that coke is plainly nearly if not quite as low as it can be expected to go. Next one notes that the spread between coke and pig iron prices is about as low as it can get. It has been lower in recent years only when

the strike of 1922 forced coke prices up sharply before the pig iron market could become adjusted. Finally, one notes that the spread between pig iron and billets is a little under normal, and has not been markedly smaller since the 1921-22 low level. Obviously this line of reasoning tends to the conclusion that the needed adjustment between bars and billets does not seem likely to be found in reduction in billet prices.

On the other hand, the chief items of finished steel, under the influence of a backward demand, are low in comparison with billets. Here, however, a ray of hope for improvement is found in the fact that the general trend of the commodity price level is upward. Reduced supplies, and the effects of our plethora of gold, have caused a gradual rise in all the price indexes during the last two or three months. In September, as shown in the third chart, commodity prices in general became relatively high in comparison with the index of finished steel prices, which is the first time that this relation has occurred since the end of 1925. It may have some significance, too, to note that the general price level turned upward after July, 1925, followed by an advance in finished steel prices in November and December. Apparently the general price level hit bottom in 1927 in July, and the possibility is thus suggested that finished steel prices, as in 1925, will turn up toward the end of the year.

Decline of 4 Per Cent in Foundry Employment in Ohio

Reports from 67 foundries and machine shops in Ohio show a continuation during September of the decline in employment which started in August, the decrease having been 4 per cent. With an average month in 1923 taken as 100, the index for September stood at 86, which is 11 per cent less than in the same month of 1926. In Ohio steel works and rolling mills the same downward tendency is noted, employment in September having been 2 per cent below that in August and 10 per cent less than in May, the peak month of the year. The trend toward lower production is most pronounced in the reports from 22 Ohio automobile and automobile parts manufacturers. In this industry the number of employees in September was 12 per cent less than in August, 29 per cent less than in May, the peak month this year, and 28 per cent less than in September, 1926.

Railroad Traffic Expected to Decline This Quarter

Transportation requirements for 27 of the principal commodities in the fourth quarter this year (the months of October, November and December) will be approximately 174,000 cars below the same period last year, or a decrease of 1.9 per cent, according to reports just received and made public today by the car service division of the American Railway Association from the 13 Shippers' Regional Advisory Boards which now cover the entire United States.

The car service division estimates that of the 27 commodities, increases in transportation requirements will be required for 14 as follows: All grain; flour, meal and other mill products; potatoes; other fresh vegetables; clay, gravel, sand and stone, including gypsum, crude and powdered; petroleum and petroleum products; sugar, syrup, glucose and molasses; cement; lime and plaster; agricultural implements and vehicles other than automobiles; fertilizers of all kinds; paper, printed matter and books; chemicals and explosives; and

canned goods, which includes all canned food products.

Commodities for which a decrease is forecast include: Hay, straw and alfalfa; cotton; cotton seed and products, except oil; citrus fruits; other fresh fruits; live stock; coal and coke; ore and concentrates; lumber and forest products; iron and steel; castings, machinery and boilers; brick and clay products; and automobiles, trucks and parts.

British September Steel Output Very Large

LONDON, ENGLAND, Oct. 16.—(By Cable.)—September pig iron production was 591,500 gross tons and that of steel ingots and castings was 777,000 tons. In August pig iron output was 596,100 tons and that of steel 644,500 tons.

The comparison of this year's output with the monthly production in recent years is shown by the following table in gross tons:

	Pig Iron, Tons	Steel Ingots, and Castings, Tons
1913—Average monthly.....	855,000	638,600
1920—Average monthly.....	669,500	755,600
1922—Average monthly.....	408,500	490,100
1923—Average monthly.....	620,000	706,800
1924—Average monthly.....	609,900	685,100
1925—Average monthly.....	519,700	616,400
1926—Average monthly.....	203,500	296,700
1927—First quarter per mo....	559,100	835,700
1927—Second quarter, per mo.	683,500	826,600
1927—July	645,800	682,900
1927—August	596,100	644,500
1927—September	591,500	777,000

September steel output is the fifth largest this year with pig iron the lowest since March.

Sharp Decline in Stoker Sales

Mechanical stokers sold in September are reported by the Department of Commerce at 97 units and 26,093 hp. This is the smallest total rating of sales in more than two years. The nearest one comparable was 26,249 hp., last April. August sales aggregated 60,977 hp., while those for September, 1926, were 44,211 hp.

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Oct. 27—General Business Outlook; Nov. 17—Activity in Steel Consuming Industries; Nov. 24—Position of Iron and Steel Producers.

OPEN-HEARTH COMMITTEE

Fall Meeting in Detroit to Cover Many Subjects of Practical Interest

SYNOPSIS of the topics to be discussed at the semi-annual meeting of the open-hearth committee, under the auspices of the American Institute of Mining and Metallurgical Engineers, at the Hotel Statler, Detroit, Nov. 2, 3 and 4, is being distributed. The discussion on the morning of Nov. 2 will be on the value of pre-heaters for heating air before going into the regenerator, as compared with installation of waste-heat boilers.

Many topics are included in the afternoon program. These include pit practice; rimming steel manufacture, with reference to top and bottom pour, effect of high residual manganese and deoxidizers; percentage and analysis of pig iron for use in low-carbon heats; test and inspection of heats after rolling and before shipment; cause of snakes in steel and how they can be eliminated; what is considered a good yield on 68 to 72 per cent hot metal and on 40 to 45 per cent pig iron charge; can dissolved iron or manganese oxide be detected in pig iron, and what effect have they on the quality of steel made from pig iron containing large quantities?; cause and elimination of ferrite banding in low-carbon steels; relationship of slag volume to speed of furnace operation and to quality of steel; percentage and analysis of pig iron

Hartford Steel Treaters Enlightened on Aviation Engines

Some of the latest information on "High-Performance Air-Cooled Aviation Engines" was presented at the October meeting of the Hartford chapter of the American Society for Steel Treating, Oct. 11, in the auditorium of the Hartford Electric Light Co. The speaker was Earl A. Ryder, assistant chief engineer Pratt & Whitney Aircraft Corporation, Hartford. The address was illustrated with lantern slides of the Wasp and Hornet engines, which are products of Mr. Ryder's company. The speaker answered questions which ranged from requests for technical information on power, torque, etc., to "how much does it cost to run one of these engines?" The records made by this engine in the American naval service were discussed by A. H. d'Arcambal of the same company.

F. G. Hughes, nominee for national president of the society, brought a brief message from the national society. The attendance prize, consisting of a chime clock, was presented to E. C. Davis of the Hartford Empire Co., who won the September meeting contest. The October prize, consisting of an electric chafing dish, was presented to A. C. Schmeltzer of the Pratt & Whitney company.

The next meeting will be held Nov. 8, with William Finkl, A. Finkl & Sons, Chicago, as the speaker on "Heat Treatment of Alloy Steel Die Blocks."

Secretary Hoover's Speech Next Week to Come from Phonograph

WASHINGTON, Oct. 18.—Marking the first time in history that a national figure has used the phonograph record as a means of making a scheduled speech at a meeting which he was unable to attend, Secretary of Commerce Herbert Hoover from his office in Washington on Friday of last week delivered an address of welcome which will mark the opening of the fifth annual convention of the American Institute of Steel Construction at the Hotel Carolina at Pinehurst, N. C., Oct. 25. Mr. Hoover spoke into the microphone of a special recording apparatus installed in the Department of Commerce building by the Victor Talking Machine Co., so that his speech was recorded not only for the convention but for all time.

When Mr. Hoover found that he was unable to accept the invitation to attend the convention and deliver the address of welcome, the American Institute of Steel Construction, determined to have at least his voice, at once enlisted the cooperation of the Victor

for greatest furnace speed; how and when to take final preliminary tests, and how to cool high-carbon steel samples; method of setting and maintaining open-hearth bottoms.

For the morning session, Nov. 3, the topics include new methods for controlling a furnace to increase its speed and life; difference in rebuilding costs for coke-oven gas, liquid fuel and producer gas furnaces; advantages, if any, to be derived from deepening checker chambers; number of checker brick salvaged on a general repair and question of how they may be cleaned and whether cleaning is advisable; practice with regard to air spaces between slag pocket walls and regenerators, and to what extent slag pockets are insulated; temperature at rear peep hole in air checkers when heat is tapped; fuel practice in B.t.u. per ton, including fuel for heating up and for ladle and spout and what percentage of loss is figured on coal practice due to producer operation; when should a new roof be installed?

For the afternoon session, Nov. 3, the topics include the Isley furnace; refractory practice, covering raw vs. burnt dolomite, domestic vs. foreign magnesite and use of chrome ore for patching jams and tap holes; relationship of mold analysis to mold life; discussion of furnace construction questionnaire; problems for the spring meeting of 1928.

On Nov. 4 a visit will be made to the River Rouge plant of the Ford Motor Co., where blast furnaces and open-hearth and electric furnaces will be seen. Other plant trips will be arranged, as demand warrants.

company, and Secretary Hoover readily agreed to make a record. The largest reproducing instrument ever built will be installed in the convention hall for the presentation of his speech.

It was pointed out that while the radio permits a speaker to send his voice through the air to millions of listeners at the moment he is speaking, this new use of recording presents a means of making a specific speech to a definite group at any time. The recording of Mr. Hoover's speech was under the supervision of Walter W. Clark, head of the Victor company's recording activities. Installation of the apparatus in the Department of Commerce building was in charge of Raymond Sooy, head of the company's recording laboratories.

Testing Society's Membership Now Worldwide

An analysis of the membership of the American Society for Testing Materials shows that in recent years it has become worldwide. It is no longer confined to the United States, or to the United States and Canada, but has extended extensively in foreign countries. Ten years ago the membership totaled 2193, of which 122 were in foreign countries, with 76 of these in Canada. Since then the total membership has doubled, and on Aug. 1 was 4289. The membership in foreign countries, however, has quadrupled and now numbers 462. From a total of 15 foreign countries represented in 1917, the number has increased to 38 this year. In Canada there are 153 members, and the total in all of the British or English speaking foreign nations is 280. The number of members in countries speaking languages other than English is no less than 182.

"Nickel Week" in Paris

Dr. Paul D. Merica, research director International Nickel Co., New York, sailed recently for Paris, where he is now attending the technical conferences and a general exposition held under the auspices of the Centre d'Information du Nickel. This is being held under the designation of "Nickel Week" at the Conservatoire National des Arts et Métiers. The technical meetings are on the metallurgy and application of nickel, and the exposition covers nickel and its derivatives, as well as alloys. On each day, from Oct. 16 to Oct. 27, one technical paper is scheduled, the author in each case being a prominent French scientist or metallurgist. Among these may be mentioned Guillet, Portevin, Charpy and Guillaume.

Tariff Commission's Report to Be Next Step in Fluorspar Case

WASHINGTON, Oct. 18.—The next step in the fluorspar case before the Tariff Commission will be that body's report to the President. It will then rest with the chief executive as to whether or not the present duty of \$5 per net ton is increased by 50 per cent to \$7.50 a ton, as requested by domestic producers, or whether the duty is left unchanged, as requested by domestic steel users, especially the Bethlehem Steel Co. and others who import fluorspar.

The brief for the domestic producers of fluorspar was filed with the commission through a committee consisting of G. H. Jones, R. C. Allen and Ben E. Clement. The brief of producers, like that of consumers, gives general support to the statement made by the Tariff Commission following its investigation through experts. Request is made by the producers that acid lump spar be classified as 98 per cent calcium fluoride with 1 per cent or less silica. The producers point out the low operations of domestic mines, which are ascribed to foreign competition, particularly from England, and contend that the market would be expanded to the east, although not to the Atlantic seaboard, if the duty were increased. The contention was made that it is essen-

tial that American mines be put back on mass production as a means of preserving a source of spar not only for peace times but also for national defense.

In its brief opposing an increased duty, the Bethlehem Steel Co. pointed out that Pittsburgh is the greatest center of consumption and agreed that it should be considered the principal market, as well as the chief field of competitive contact between domestic and foreign spar. England was conceded to be the principal competing country. There is no reason to think, it was contended, that there is in fact any difference in producing costs in the two countries in excess of the present duty when due consideration is given to the cost of transportation. Other arguments are that all grades of spar should be considered together; that any increase in duty would be unwarranted and would not materially broaden the market for the domestic producers and, to the extent that it might broaden it, would do so at the expense of the very limited reserves in the United States. It is estimated that the Bethlehem company consumes 80 per cent of the imported gravel spar.

In arguing against a higher duty, the Hazel-Atlas Glass Co., interested in the ceramic grade, declared that an increase would compel it to increase the selling prices of its products at a time "when the general market is very much declining."

Flat Steel from Cammen Centrifugally Cast Bars

Experiments on a commercial scale of producing finished steel from centrifugally cast bars were recently carried out at the plant of a large American steel company. The process was that of Leon Cammen, consulting engineer, New York, whose activities and achievements in the field of centrifugal casting have been discussed in THE IRON AGE. His latest work has had to do with the centrifugal casting of billets for further rolling at once into such finished products as bars, strip-steel stock, bars for tin plate and galvanized products and so on.

The details of his apparatus were published in THE IRON AGE, July 7, 1927, taken from a paper, "Centrifugal Casting of Steel," which he presented before the winter sectional meeting of the American Society for Steel Treating, at Washington, in January. The discussion of the paper was reported in THE IRON AGE, Jan. 27.

For the recent trials, a centrifugal machine handling 400 to 500 lb. of molten steel was constructed. In the first application, results were not entirely satisfactory. The main difficulty was the existence of blow holes just under the inner surface of the concave bar as cast. These were not considered serious as affecting the quality of the product but the appearance was the main objection.

In the later experiments, at the large plant referred to, the blow or gas holes were eliminated. The

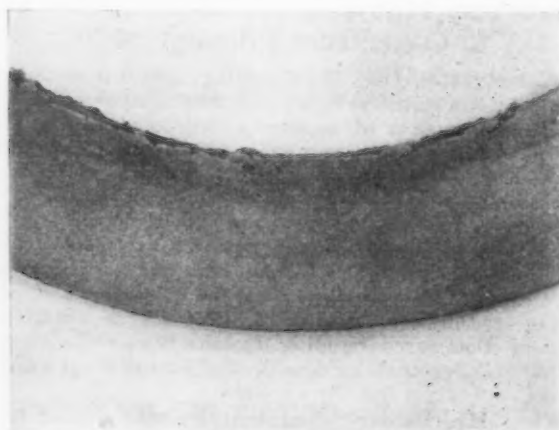
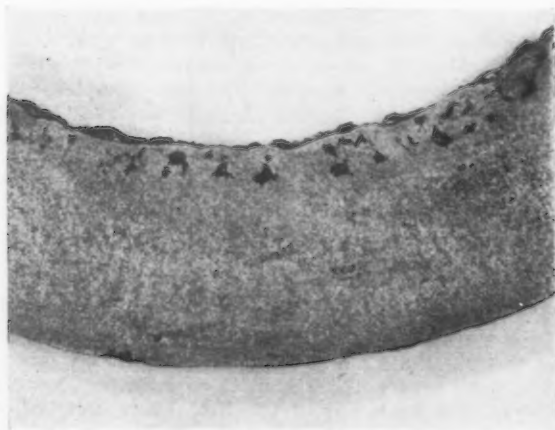
actual appearance of a cross section of the bars as cast are shown in the macrographs here reproduced.

Sections of the cast bars or slabs, originally about 6 ft. long, have been rolled into a product about $\frac{1}{8}$ in. thick and $4\frac{1}{2}$ in. wide. This product is found to have satisfactory surface, which was declared to be excellent by the rollers. The steel was a plain carbon electric steel, containing about 0.35 per cent carbon.

In the crude centrifugal machine used it was necessary to use considerable sand and clay mixture along the lugs or steel partitions which separate one cast bar from another, thus to facilitate removal of the cast product. This resulted in some contamination of the steel with sand and clay, particularly along the edges of the bars. Most of this came off before or during the rolling, but the product as stated above was otherwise satisfactory. In machines for larger scale production, such difficulties, it is claimed, will be avoided by the design of the mold.

A saving of about \$4 per ton is claimed, through the elimination of blooming and avoidance of crop and scrap.

Production of both iron and steel in Austria during the first six months of the current year exceeded that for the corresponding period of last year, the output of pig iron being 208,897 metric tons against 185,049 tons, while the steel production was 266,215 tons and 263,756 tons, according to a report received by the Iron and Steel Division, Department of Commerce, from Consul Richard B. Haven and Vice-Consul C. Warwick Perkins, Vienna.



Macrograph (Left) of a Section of the First Steel Bars That Were Centrifugally Cast, Showing Blow Holes on Inner Surface. The steel more recently cast was practically free from such defects as shown by the other macrograph

COKE AT HIGHER RATE

September Total Tonnage Below August, but Daily Production Greater

WASHINGTON, Oct. 17.—The output of by-product coke in September amounted to 3,602,000 tons, a decrease of 63,000 tons, or 1.7 per cent, when compared with August, says the United States Bureau of Mines. The average daily rate of production, however, increased from 118,225 tons in August, with 31 days, to 120,067 tons in September, with 30 days, a gain of 1.6 per cent. The September production was the highest yet recorded for that month, with the exception of September, 1926.

Of the 79 plants, 78 were active, and these plants produced slightly more than 80 per cent of their capacity. Of the total production of by-product coke in September, 2,921,000 tons, or 81.1 per cent, was made in steel works ovens and 681,000 tons, or 18.9 per cent, was made at merchant or other ovens.

Production of beehive coke during September declined, also. The total, 457,000 tons, was 30,000 tons or 6 per cent less than that of August. The daily rate of 17,577 tons for the 26 working days showed a decrease of about 2.5 per cent when compared with the rate of 18,037 tons for the 27 working days in August.

New Manganese Steel Foundry at Chicago

At Burnside, at the south side of Chicago, the American Brake Shoe & Foundry Co. has operated for many years an iron foundry. This plant has just been purchased by the American Manganese Steel Co., Chicago Heights, Ill., so that it will constitute the seventh plant in a chain of foundries extending from Delaware to California. In this plant the company will soon produce special manganese steel castings by the electric process. The former and other customers of the iron foundry will be taken care of. It is planned to start the manganese steel department about Jan. 1.

Adopts Paper Packing for Brick Shipments

E. J. Lavino & Co. announce that all refractory brick shipped by them in the future will be stacked into cars, each row separated from others on all sides by a strip of heavy indented or embossed paper. This innovation has been adopted in the interest of safe shipment, as experience indicates that the time-honored method of packing in a little straw not only delayed unloading, and created much litter, but did not prevent considerable damage in transit. The Lavino company believes that the paper packing will avoid these disadvantages to a great degree.

Saw Manufacturing in New England

WASHINGTON, Oct. 18.—With 12 establishments in Massachusetts, four in Connecticut and one each in New Hampshire and Rhode Island, almost one-fourth of the saw manufacturing plants in the United States were located in New England in 1923, according to a recent industrial survey conducted jointly by the Department of Commerce and the New England Council.

Du Pont Celebrates 125th Anniversary

In commemoration of 125 years of growth, a celebration was held by members of the Du Pont family, employees and guests numbering about 3000 in the vicinity of the Brandywine Mills where the first black powder was made. Other celebrations have been held in the principal factories, and a handsome number of *The Du Pont Magazine* recounts the milestones of progress.

One is struck with the diversity of industry which has grown from a constant effort and search for improvement in plant and process. From black powder

has come smokeless powder, nitroglycerine and dynamite. Study of the cotton required for nitroglycerine has developed a chemistry of cellulose, whose practical application has brought the manufacture of such useful everyday things as celluloid, fabrikoid (artificial leather) and other substances made of pyroxilin (from Christmas tree ornaments to artificial ivory toilet ware and Duco enamels and lacquers). Rayon (artificial silk), motion picture film, and cellophane (transparent paper) are other important commercial by-products of the explosives research.

British Steel Imports in September Large

WASHINGTON, Oct. 18.—September imports of iron and steel into Great Britain at 312,018 gross tons, were 25,747 tons greater than that for August, while the exports, at 384,919 tons, were almost equal to the July total, and approximately 33,000 tons less than the peak reached in May. The unfavorable balance over the current year has been decreased from 613,678 tons at the end of August to 540,777 tons at the end of September.

New German Magazine on Iron and Steel

A new monthly publication was started in July by the German Iron Institute (Verein deutscher Eisenhüttenleute) called "Archiv für das Eisenhüttenwesen." Contents are grouped into six classifications: Coke, pig iron and foundry, steel making, rolling mills and finishing departments, machinery and power, quality and tests, and general management. The publisher is the Verlag Stahleisen M. B. H., Breite Str. 27, Düsseldorf, Germany, and the subscription rate of 50 reichmarks per year.

Manchurian Works to Erect More Blast Furnaces

WASHINGTON, Oct. 17.—The Anzan Steel Works, owned by the South Manchuria Railway Co., is planning to increase its pig iron production from 200,000 tons a year to about 500,000 tons by the erection of additional blast furnaces, says an announcement by J. Yamamoto, recently appointed president of the railroad. The report was received by the Department of Commerce from its assistant commercial attaché at Tokio, J. H. Ehlers.

Purchase British Timken Interests

The Timken Roller Bearing Co., Canton, Ohio, and M. B. U. Dewar of London, England, have purchased from Vickers, Ltd., all of the capital stock of British Timken, Ltd. This purchase gives the Timken interests complete control throughout the world of the manufacture and sale of Timken bearings.

Mr. Dewar, who now assumes active management of British Timken affairs, was until recently managing director of the Metropolitan Carriage, Wagon & Finance Co., Ltd., Birmingham, England, and was also a member of the industrial management board of Vickers, Ltd.

The Birmingham plant of British Timken, Ltd., is being enlarged and large quantities of new machinery and equipment have been installed. Officials of the British company are now at the Canton works making final arrangements for the immediate establishment of factories in France and Germany.

Gary, Ind., this week has celebrated its twenty-first birthday. A corner-stone was laid for the new \$1,000,000 city hall, another for a \$500,000 Gary school memorial auditorium and a new Gary hotel and the Post-Tribune building were formally opened. At the banquet, attended by more than 500 industrialists and leading citizens of Gary, a vacant chair was left at the head of the speakers' table, a chair placed there for Judge Gary, the city's benefactor, who was to have been the principal speaker at that banquet.

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This Issue in Brief

Steel prices may move upward toward end of the year, says Dr. Haney. Apparently the general commodity price level hit bottom in 1927 in July, and, as in 1925, finished steel prices may advance during the last quarter.—Page 1098.

A busy business is not necessarily a prosperous one. Do not confuse high gross receipts with high profits, cautions Department of Commerce official. Rather than devote all your time to increasing sales, study how to cut costs, thereby increasing your profits.—Page 1083.

The life of cast iron pots used for malleable annealing can be increased by higher carbon, silicon and manganese in the iron. A further gain in the number of heats per box may be made by additions of aluminum and chromium to the molten top metal.—Page 1086.

Automobile makers are behind farm equipment manufacturers in economical manufacturing, says International Harvester Co. official. Even though the automotive is the newer industry, profiting by the mistakes of the older, the motor car builders still have much to learn from their older, smaller brother. As an example, the speaker cited the price of 22c. a lb. for the cheapest automobile, against 21c. for the combine, the most expensive agricultural implement.—Page 1084.

Forging bars can be heated 24 per cent cheaper by gas than by oil, says gas man. Continuous type of gas furnace is said to be capable of heating to forging temperature at the rate of 75 lb. of metal per sq. ft. of hearth area.—Page 1095.

Coal bill of the nation is \$5 billions per year. About 600 million tons of coal is consumed annually, approximately 5 tons per capita. One-sixth of it is anthracite.—Page 1077.

All special machine tool engineering service will be charged for, before long, association head believes. The large increase in special machines has brought about growing demands for engineering assistance, and the cost of this work is cutting into profits. The time is approaching when every machine tool builder will have to make a special charge for all service necessitated by the particular problems of the user.—Page 1089.

Metal loss in brass melting is as low in gas-fired crucible furnace as in arc-type electric furnace, gas company engineer declares. But finds that in a certain induction-type electric furnace, where the heat is applied within the metal itself, and at the bottom of the crucible, the loss is lowest.—Page 1095.

Increases blast furnace output $7\frac{1}{2}$ per cent by taking the moisture out of the blast. Blast furnace gas is successfully dehydrated by using silica gel, which will absorb about 20 per cent of its weight of water. By raising the temperature, the water can be driven off, and the gel is again ready for service.—Page 1080.

Why steel plates crack is still a mystery. Extensive tests by British metallurgist reveal no solution. However, the belief formerly held, that steel at a little above normal temperatures would fail, under mild stresses applied over long periods of time, is found to be without grounds.—Page 1082.

Hot blast applied to foundry cupola cuts coke consumption 26 per cent. Griffin Wheel Co. has perfected a cupola which can be operated by either preheated blast or cold blast. Gas drawn from below charging door is burned in a combustion chamber, preheating the blast. Economy results from the fact that the hot blast promotes more complete combustion.—Page 1072.

Farm equipment manufacturers expect 1928 to be a good year. The trend toward labor-saving equipment in agriculture is greater than ever before, and in addition, the industry expects to profit by the \$300 million increase in farm income forecast for the fiscal year ending next June.—Page 1085.

Cast iron specimen with the lowest scleroscope hardness proves to be the most difficult to machine. Tool builder finds that the cause is the presence of crystal formations known as Steadite, occurring in castings of more than 0.30 per cent phosphorus.—Page 1091.

Steel production is near the bottom of a cyclical decline, Dr. Haney believes. The cycle is in its thirteenth month, and though an upturn may be near, a further decline probably will occur before recovery begins, says economist.—Page 1096.

Mild steel shows considerable resistance to prolonged stress at elevated temperatures. A strip of 0.106 per cent carbon steel has withstood for five years severe stresses up to two-thirds of the normal breaking stress. The stresses were applied for prolonged periods, at 300 deg. C.—Page 1082.

Automatic control enables one man to do the work formerly done by four, in charging billets into heating furnace. The control box is carried by the operator by means of a strap around his neck. Push buttons enable him to operate the control board installed in power house.—Page 1085.

Ability of a metal to resist wear cannot be determined by original hardness. Original hardness bears no relation to the hardness induced by abrasion. It appears probable that work-hardening does not occur unless the conditions of abrasion are so severe as to cause some plastic flow of the metal below the abraded surface.—Page 1083.

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Profitless Prosperity

COINED by Colonel Ayers of Cleveland, the above phrase was used by him in an article summing up the business situation. It is an arresting alliteration and suggests a broad field for thought. Many men who are now conducting business on a large scale at only a small profit, or even no profit at all, will accept approvingly this epitome of their experience. On the other hand, many men in business are enjoying great profits. The stock market reflects such differences. Some securities have been soaring to great heights, while others are depressed. There are some men who this year have cashed in for large sums on investments they carried for only a short time. There are other men who have diversified holdings, carried for several years, which they could not now liquidate except at a loss.

These antitheses seem to introduce something paradoxical. Yet in reality there is nothing of that sort. In previous articles we have frequently discussed these features. In brief, we have been having a selective prosperity and a selective bull market in securities and we still are.

The fertilizer companies have just been reporting a bad year. Likewise the meat packers. The petroleum producers have been passing through a period of tragedy. The textile manufacturers, in general, have been in a bad way. We might continue the enumeration.

On the other hand, the railroads and automobile manufacturers have been doing very well, especially the former. There are some producers of raw materials and some manufacturers of specialties who have been doing phenomenally.

In general, the existing economic situation shows a high rate of consumption of goods per person, which in the aggregate is probably as high as in 1925, although in details there are distortions. Thus, the consumption of gasoline is the greatest we have had, but the use of metals in building construction and in automobile manufacture is slightly curtailed. Nevertheless, on the whole little fault is to be found with consumption.

The ground for complaint on the score of absence of profit is in almost every instance ascribable to excessive production, or excessive ability to produce, either of which produces a degree of competition that tends to extinguish profit. And profit is preserved only, and in a moderate way, if there be influences and conditions that make it possible to restrict production. In some industries—petroleum producing, for example—that does not appear to be possible; in others it is practicable in a mild way.

The railroads have enjoyed increased profits by virtue of increase in volume of business and decrease in operating expense. The industrial concerns that are now realizing great profits may be classified as those having exceptionally rich natural resources; those which have developed new articles of manufacture not yet grown seriously competitive; and those which are free from competition by virtue of a monopoly or which have acquired a prestige rendering them more or less immune to competition.

Illustrations of these different classes may be given. Copper production is strongly competitive and conditions in that industry are generally unsatisfactory; but the Chile Copper Co., having an enormous mine from which it can produce relatively cheaply, continues to make a great profit. Even more distinguished is the position of the two brimstone companies, which produce an essential commodity, whereof new deposits that might be competitive are difficult to discover. Among concerns that have developed the manufacture of new things are the rayon producers, and perhaps most strikingly the DuPont company, which has entered not only into the manufacture of rayon, but also of lacquers and many other new chemical products.

Producers with the protection of patent monopoly or an impregnable prestige are such as the United Shoe Machinery Co., the Gillette Safety Razor Co. and the Singer Mfg. Co. Without such protection or such a position of prestige a new industry, that begins by being very profitable, *ipso facto* attracts competition and gradually

becomes less profitable, this being the experience of cinematography and radiotelephony.

Everything that has developed into our present situation is perfectly normal, following a gradual change from the principles of a capital economy to those of a consuming economy. Thus, if we should find it necessary to build more railroads or greatly increase the capacity of those we have, or if the popular will should switch to the desire to have more floor space on which to live rather than so many automobiles in which to ride, there would be a diversion of demand, and some industries that now suffer from excessive competition might find themselves in an easier situation.

Meanwhile, it is useless to complain of existing conditions, as expressed in the phrase "profitless prosperity." Rather must they be accepted as they are, which means that intelligent persons will govern themselves accordingly.

Mr. Robinson's Glasgow Paper

IT is not surprising that the members of the (British) Iron and Steel Institute put a high value on the paper T. W. Robinson, vice-president of the Illinois Steel Co., presented at the institute meeting at Glasgow last month. It dealt with "The Economic and Social Development of the American Iron and Steel Industry" and, as readers of the liberal abstract given in THE IRON AGE of Sept. 22 will agree, threw much light on the questions often asked in Great Britain as to the reasons for the present industrial prosperity of the United States. It is matter for comment that in the discussion of the paper at the Glasgow meeting several participants referred to its exceptional literary quality. This is not a common observation in respect to such contributions. While they may be clearly expressed, the general run of society papers is devoid of arresting or pungent phrasing. Mr. Robinson's command of effective discourse was well demonstrated in his paper on "The Need of Vocational Education" which he read at the Chicago meeting of the American Iron and Steel Institute in October, 1913. The talent is one not too liberally conferred upon steel men.

In saying that Mr. Robinson's paper made the Glasgow meeting memorable, one spokesman for British steel makers voiced the broad-minded view that seemed to prevail, in contrast with expressions that now and then crop out yonder on the American propensity to boast of what is being done here. Mr. Robinson did not hesitate to criticize the shortcomings of American business, as most glaringly exhibited in the last two decades of the 19th century; also, in considering the causes of the successes our steel industry has achieved in the 20th century, his analysis was rather factual than argumentative.

In their comments, the institute members centered on these passages in the paper as giving the key to the large results attained in American industry:

A vital factor in the development of the 20th century, and one which has been especially emphasized in the United States since 1914, is the multiplication of individual effort rather than the effort of multiplied individuals. . . . The United States during the past few years has been experiencing the unprecedented economic condition of continuously falling commodity

prices, high wages, and continued prosperity. . . . High wages mean high consumption. The larger the output of the individual workman, the greater is the tendency to lower costs and the greater the possibilities of return in wages and in dividends. . . . The true answer to this economic paradox of combined high wages and lowering prices of goods, and the underlying primary cause of the late industrial progress of the United States, lies in the increased and unrivaled output of the individual American workman and the large accumulation of wealth that has resulted from it.

It was inevitable that such a paper as Mr. Robinson's would bring from British steel makers expressions, by no means new, on the unwillingness of British workmen to cooperate with management for the reduction of costs. Mr. Robinson gave figures from the records of the Illinois Steel Co. at South Chicago showing that the worker in a modern iron and steel plant is producing from 1½ to eight times as much as he did 25 years ago. The ore-handling capacity of the average man at South Chicago has increased since 1902 from 6000 to 48,000 tons a year; his pig iron output from 675 to 2405 tons; his Bessemer ingot production from 1761 to 3730 tons; his open-hearth ingot production from 1049 to 1842 tons; and his rolling capacity from 603 to 1240 tons of rails.

One of the Glasgow commentators averred that in low costs lay the whole solution of the problem of high earnings on the part of labor. In so saying he echoed in part the conclusion of the two talented young Britons who, after widely touring the United States two years ago, wrote the book "The Secret of High Wages." It spoke plainly to both employers and workmen in this nutshell statement which is given added weight by the disclosures of Mr. Robinson's paper:

The very life of this country depends on two things: deliberate adoption by employers of a policy of high wages, and intelligent understanding on the part of the men that every mechanical aid to efficiency must be used to the utmost.

The organization of cheaper production on American lines must be accepted and restrictions on individual output must be swept away.

Cooperation with Management

WE take it that the American Federation of Labor convention which concluded its sessions at Los Angeles last week was by no means throwing dust in the air when it declared for a policy of collaboration with employers along the line of considering costs and profits, putting the old strike idea far in the background.

Other evidences of a new attitude on some phases of industrial relations have appeared in the past year. One of these was the paper by one of the Federation's vice-presidents, Matthew Woll, before the American Society of Mechanical Engineers last December, in which he said that American trade unions are ready to cooperate with manufacturers for increasing efficiency of production. Another was the conference last April under the auspices of the Central Labor Union of Philadelphia at which officers of the federation told of union labor's desire to work with management for the elimination of waste in industry.

One may say off-hand that the Los Angeles dec-

laration is natural and proper in view of existing conditions. But consider one big circumstance in particular. The United Mine Workers, one of the largest contingents in the Federation, has been engaged in a six months' strike, now practically but not technically ended. Just before the Los Angeles convention the Federation promised that after the convention it would give the United Mine Workers much help. William Green, who succeeded the late Samuel Gompers as president of the Federation, came from the United Mine Workers and is plainly the leader in the Federation's new thought.

What then? Can the Federation, fresh from this convention with its new attitude of considering the employer's position and avoiding strikes except as a last resort, at once turn in to support the only big strike there has been for a long while, a strike that was started with a blind refusal to consider anything but renewal of the Jacksonville scale? Mr. Lewis never denied that the union coal operators were badly off. He merely made the specious claim that they would also be badly off if a lower union scale were adopted, by non-union operators reducing their rates. There is more in the matter than this. It takes little acquaintance with coal trade history to show that the essence of a coal strike is to make coal scarce, with more or less collusion in the old days between operators and the union. The coal strike has outlived its usefulness along that line.

One may reasonably conjecture that it is rather because of than despite the fact that Mr. Green came from the United Mine Workers that he has these new views as to cooperation with employers and dismissal of the strike as a means of accomplishing good. In other words, his mind is filled with realization of the fact that the United Mine Workers is a horrible example of how not to do it.

The Federation has promised to help the United Mine Workers. It cannot do so by supporting the union in its dog-in-the-manger attitude. Whether it can help it at this late date by reforming it, by saving it from itself, is doubtful, but no other form of help seems possible in the circumstances. The Federation can at least clear itself by requiring the United Mine Workers to adopt the Los Angeles policy or go ahead and complete its suicide, whereupon the Federation would be much stronger, although smaller.

Testing Society's Wide Influence

TWO news items stand out in the last *Bulletin* of the American Society for Testing Materials. In ten years the number of standard and tentative standard specifications has increased more than 200 per cent, from 164 in 1917 to 515. Greater than elsewhere was the gain in the non-ferrous field, from 19 ten years ago to 70 now—a reflex of the rapid advances in that section of the metal industry. A second item has to do with membership in foreign countries. This has nearly quadrupled in ten years—from 122 in 1917 to 462. Of the present foreign members 182 are in non-English-speaking lands. The figures are an index not only of the great importance and extent of the work of the American society, but of the measure in which it has taken the place of the Inter-

national Association for Testing Materials in the fifteen years since the final convention of the latter in New York. In this connection it is significant that the "New International Association for Testing Materials" formed at Amsterdam last month will not undertake specification work but will be occupied largely with preparing for and holding triennial or quadrennial congresses.

Locomotives on Parade

NO straws pointing toward electrification of steam railroads could be seen at the centenary exhibition of the Baltimore & Ohio Railroad, held recently at Baltimore. This notable pageant showed the development of the steam locomotive in rich detail, not only in full-sized models of early designs, but in the original engines from each decade, operating under their own steam. Examples of electric traction were comparatively few. This contrast in numbers probably represents the relative importance of steam and electricity to main line traffic today.

Certainly the B. & O. railroad cannot be accused of undue partiality, since it installed the first electric locomotive to operate on a steam railroad in its tunnel under Baltimore in 1895; it has gas-electric cars operating on branch lines; furthermore, its mountain divisions with steep grades and heavy traffic should offer the best chance for economies through regenerative braking in electric locomotives, and undoubtedly this opportunity has been carefully examined.

Every effort now seems to be made toward increasing the power and operating efficiency of the steam engine. In fact the ordinary observer would judge that as great a change has been made in locomotives during the last 25 years as was made in the first quarter century. Certainly the rolling power plant has been improved in a number of respects, until at present the older engines, modernized by the addition of stokers and superheaters, are reported to be able to evaporate 8 to 10 pounds of water per pound of coal, and develop 1 indicated horsepower hour for 14 pounds of water evaporated (when running at high speed and early cut-off) or about 22 pounds of water evaporated (when operating at slow speed and late cut-off). Properly to appraise this achievement it should be remembered that first class stationary power plants will evaporate from 10 to 11 pounds of water per pound of coal and require 10 pounds of steam to produce 1 indicated horsepower hour.

It may be said therefore that the steam locomotive is far from being the wasteful engine it once was. Use of superheated steam at high pressures has raised the fuel economy without reverting to compounding. The latter has been given an extended trial by the Baltimore & Ohio Railroad on Mallet engines, but abandoned because the mechanical difficulties due to unbalanced thrusts from the high and low-pressure cylinders cost more in repairs than the steam saved. Automatic stokers have enabled the evaporation rate to be raised. Auxiliary engines attached to trailing trucks or tenders, known as "boosters," have given the steam locomotive that large starting effort which is one of the advantages of electric traction, and yet the electric motor has not been able to maintain high

torque with high speed, a characteristic of the steam engine.

With the passing years has come a growth in weight (which is obvious to everybody), in steam pressure, and in tractive effort. However, engines in operation 40 years ago developed as big a draw-bar pull per ton weight as do the biggest Mallet engines. The table below, showing developments on the B. & O., illustrates these points:

Date	Name	Pounds Pres- sure	Tons Weight	Pounds Tractive Effort	Tractive Effort Per Ton
<i>Freight Locomotives</i>					
1875	J. C. Davis	110	45	14,700	325
1888	A. J. Cromwell	155	62	30,200	485
1909	Consolidation	205	110	42,168	385
1926	Santa Fe	220	218	84,300	385
1927	G. H. Emerson	250	163	76,400	470
<i>Mallet Locomotives</i>					
1919	Mallet	220	245	118,800	485
<i>Passenger Locomotives</i>					
1896	Harvey Middleton	190	77	23,740	310
1919	Pacific	200	140	40,200	285
1927	President Washington	230	159	50,000	315

This brief account of notable locomotive developments must not fail to report the chorus of praise given by American railroad men to the King George V, built by the Great Western Railway Co. at Swindon Works, England. It is an express locomotive, having four cylinders, two of

them high pressure, located under the boiler and connected to the cranked axle between the first drivers. It carries 250 pounds steam pressure, weighs only 89 tons, yet develops a tractive effort of 40,300 pounds (450 pounds per ton of engine, and not so bad when compared with passenger engines listed in the above table). It hauls a 410-ton passenger train on a non-stop run from Paddington Station to Plymouth, a distance of 227 miles, in a scheduled time of 242 minutes. One stretch of 155 miles is run at the average rate of 62 miles per hour. Yet this most powerful express locomotive in Great Britain looks like a stripling alongside the grown-up American engines.

Figures, however, convey no idea of the masterful workmanship required to pack so much power within the clean and elegant lines of this English locomotive. The American creation in contrast is replete with visible appendages of auxiliaries, which, while imparting the air of giant power, are part of deliberate planning to save the crew from crawling underneath to inspect and care for working parts.

More than one American engineer was heard to exclaim, as he finished a minute and critical examination of the King George V, "She certainly is a beautiful job!"

CORRESPONDENCE

Placing a Value on Sponge Iron

To the Editor: In your issue of Oct. 6, pages 937 and 938, appears a very interesting article describing the new sponge iron plant in Japan, which is now in operation. While it is evident from the article that as yet it cannot be definitely said that the plant is an economic success, the costs and other figures presented are promising.

Ultimately commercial success must depend upon the price obtainable for the sponge iron manufactured, and the article in question sets this price at the level of pig iron. The comparison of the price of pig iron and the price of sponge iron unquestionably is open to question primarily because pig iron and sponge iron are two widely different products. The value of sponge iron should better be based on results obtained with the finished steel or iron products produced from sponge iron.

Above all, the value of sponge iron cannot be considered without knowledge of the quality of the product itself, and it would have been well if the article in question had given the analysis of the Japanese sponge iron. In the absence of such analysis one cannot know whether the \$20 price is for a product containing 60 per cent iron or higher. Evidently, sponge iron containing 96 per cent iron would be much more valuable than a product containing 60 per cent iron and consequently command a higher price.

Other important points to be considered in the valuation of sponge iron are the grade of reduction from the iron oxides to Fe, the actual amount of other impurities and their form, whether combined with the iron or whether still unreduced from their mineralogical compounds.

Ordinary pig iron selling at around \$20 a ton contains carbon, a comparatively high percentage of impurities, and (being produced with hot blast) is more or less contaminated with oxides and nitrogen. Better grades of pig iron are produced in, for instance, cold blast electric charcoal furnaces and obtain prices twice as high. Muck bars and Swedish iron obtain still higher prices, used as a melting stock.

At present one grade of imported sponge iron, as

has been mentioned in THE IRON AGE, is selling on the American market, giving excellent results in open-hearth as well as in electric furnaces. It sells at slightly over \$40 per gross ton, duty paid.

It would be well if the value of sponge iron were compared with the value of other melting stock, only in accordance with results obtained. This would give the various "grades" of sponge iron their proper place according to quality. As time goes on such results undoubtedly will be offered your paper for publication.

Sponge iron may be rather poor in Fe, with a low grade of reduction and a high percentage of combined impurities, or it may contain up to 97 to 98 per cent Fe, with almost complete reduction, and the iron free from combined impurities. The values of the different grades are not immediately comparable either with muck bars, pig iron or scrap.

N. K. G. THOLAND,

Ekstrand & Tholand,

Oct. 14.

1 East Forty-second Street, New York.

Correction should be made of a statement in our report (THE IRON AGE, Sept. 29, page 883) of the International Congress for Testing Materials, held at Amsterdam, Netherlands, Sept. 12 to 17. In the address of T. D. Lynch, manager of the materials and process engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reference was made to a report of the Department of Commerce "showing the existence in the United States at the present time of 27,000 standards." What Mr. Lynch cited was not 27,000 standards in regular use, but a collection of that many specifications of all varieties, a relatively small minority of them being standards.

Production of pig iron in France in August totaled 773,000 metric tons, as compared with 769,000 tons in July and 767,000 tons in June, bringing the total for the year to 6,180,000 tons, or approximately 3000 tons more than during the corresponding period of 1926, according to a report received by the Iron and Steel Division, Department of Commerce, from Acting Commercial Attaché R. C. Miller, Paris. The output of steel in August amounted to 694,000 tons, as against 677,000 tons in July and 672,000 tons in June. The total steel production for the eight months ended with August was 5,470,000 tons, as compared with 5,483,000 tons for the corresponding period of 1926.

Iron and Steel Markets

See Signs of a Market Turn

Predicated on Appearance of Orders of Pronounced Variety
and Confused Flurry of Irregular Price
Dips—Lower Pig Iron Prices

TWO developments of the week are taken to indicate that a turn in the steel market is imminent. One is a rather pronounced movement of miscellaneous ordering of all products, and the other is a heavy leaning toward weakness in prices, with a virtual confusion in this respect in strip steel and pipe, the result more of competition among makers than of the pressure from buyers.

There are instances of specifications and new buying so far this month being 10 per cent in volume ahead of the corresponding period of September and in the case of companies serving railroads only in a limited way. Discounting expansion in automobile production in November or December, it remains that a railroad car buying movement, not yet in evidence, is depended on to start an active revival.

Meanwhile, operations remain substantially unchanged for the industry as a whole, in the face of some advancing of ingot output in Chicago following releases on recent rail contracts.

Several weeks of the giving of supplemental and preferential discounts now give signs of some stabilization in pipe prices, without the issuing of a new card, which would be retroactive for 60 days. Buyers of standard merchant pipe have gained an average of \$2 a ton, while variable and greater concessions have ruled in the recently drab market of oil country and line pipe. Not since April, 1923, have there been until now serious recessions from the pipe schedules then established.

The price uncertainties in strip steel appear to have checked buying already curtailed by the relatively low current demand from the automobile trade. Concessions of as much as \$3 a ton, on orders of no great size, are reported from the 2.10c. price for wide hot-rolled strip and 2.30c. for the narrow strip.

The cuts in sheets developed in the last two weeks have not stimulated business. In the East further concessions have been made to jobbers on the black and galvanized products.

Sales in September of the independent sheet makers, however, were 45 per cent ahead of July and 25 per cent ahead of the average of July and August. They exceeded both production and shipments for September, by 17 per cent in the one case and 12 per cent in the other.

The heavy tonnage products are uniformly being well held, the exception being concessions of \$2 on plates on some large tank orders west of Chicago. As a conspicuous consumer of bars, the farm machinery makers, who promise to take a heavy volume well into 1928, have for the time being displaced the automobile builders.

Rail orders include 30,000 tons for the Union Pacific, 13,000 tons going to the Pueblo mill and the rest to Chicago. The 190,000 tons for the New York Central's lines in Canada and the United States may be distributed this week. The Illinois Steel Co.'s recent bookings exceed 100,000 tons.

The Great Northern is planning to build 2700 cars at Superior, Wis., and the first boat load of 5000 tons of steel for these has arrived at Duluth from Buffalo.

Without the 56,000 tons awarded for the bridge to be built across the Hudson River at New York, structural steel bookings of the week were 22,000 tons, the lowest since August. New projects include 25,000 tons for three office buildings and a hotel in Toronto and 8000 tons for a Chicago hospital.

Nine months sales this year, according to the Department of Commerce, covered 2,048,000 tons of fabricated steel, compared with 1,930,000 tons for the same period of 1926.

Pig iron prices continue to decline. Eastern Pennsylvania foundry iron is 50c. lower, and foundry and malleable grades at Chicago have dropped \$1 a ton. Western New York iron is again invading the Philadelphia district, where a sale of 2000 tons was made at a concession of nearly \$1.50 a ton from recent quotations by Buffalo furnaces.

Prices on silvery pig iron have been reduced \$1.50 to \$2 a ton depending on the grade, while Bessemer ferrosilicon has gone down \$2. Continued weakness in spiegeleisen has been reflected in another recession of \$1 a ton to \$30, furnace, for 20 per cent material.

Heavy melting scrap has declined 50c. a ton at Pittsburgh, Detroit and Birmingham and 25c. a ton at Chicago. The suspension of shipments against contracts is complicating a situation in which consumption is receding faster than scrap output. A Cleveland mill has extended an embargo on deliveries of steel-making scrap to blast furnace material. At Chicago, where there is a heavy flow of scrap from the railroads, it is becoming increasingly difficult to find outlets for material. Yard operations have been entirely suspended by two Buffalo dealers, and others are running at only half of capacity.

Reduced export freight rates from Pittsburgh to Atlantic seaboard are promised, in the order of \$4.10 a ton against a present rate of \$5.10.

Both of THE IRON AGE composite prices make new lows this week, that for pig iron declining from \$18.09 to \$17.84 a ton and that for finished steel from 2.331c. to 2.307c. a lb. Not since 1916 has pig iron been so low.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 18, 1927	Oct. 10, 1927	Sept. 20, 1927	Oct. 19, 1926
No. 2, fdy., Philadelphia...	\$19.76	\$20.26	\$20.26	\$21.76
No. 2, Valley furnace....	17.50	17.50	17.50	18.50
No. 2, Southern, Cin'tl....	20.94	20.94	20.94	23.69
No. 2, Birmingham.....	17.25	17.25	17.25	20.00
No. 2 foundry, Chicago*...	18.50	19.50	19.50	21.00
Basic, del'd eastern Pa....	20.00	20.00	20.00	20.50
Basic, Valley furnace....	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.76	19.76	19.76	20.76
Malleable, Chicago*.....	18.50	19.50	19.50	21.00
Malleable, Valley.....	17.50	17.50	17.50	18.50
Gray forge, Pittsburgh...	18.76	18.76	18.76	19.76
L. S. charcoal, Chicago....	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:

O.-h. rails, heavy, at mill..	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	36.00
Forging billets, P'gh....	38.00	38.00	39.00	40.00
O.-h. billets, Phila.....	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	43.00	43.00	43.00	45.00
Skelp, grvd. steel, P'gh, lb.	1.75	1.75	1.75	1.90

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.07	2.07	2.07	2.22
Iron bars, Chicago.....	1.85	1.90	2.00	2.00
Steel bars, Pittsburgh....	1.75	1.75	1.75	2.00
Steel bars, Chicago.....	1.85	1.85	1.90	2.10
Steel bars, New York....	2.09	2.09	2.09	2.34
Tank plates, Pittsburgh...	1.75	1.75	1.75	1.90
Tank plates, Chicago....	1.85	1.85	1.90	2.10
Tank plates, New York...	2.09	2.09	2.04	2.24
Beams, Pittsburgh.....	1.75	1.75	1.75	2.00
Beams, Chicago.....	1.85	1.85	1.90	2.10
Beams, New York.....	2.09	2.09	1.95	2.34
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Oct. 18, 1927	Oct. 10, 1927	Sept. 20, 1927	Oct. 19, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.90	2.90	3.00	3.00
Sheets, black, No. 24, Chi-	3.00	3.10	3.10	3.20
cago dist. mill.....	3.75	3.75	3.85	3.85
Sheets, galv., No. 24, P'gh	3.85	3.95	3.95	4.05
Sheets, galv., No. 24, Chi-	2.15	2.15	2.25	2.30
cago dist. mill.....	2.30	2.35	2.35	2.50
Sheets, blue, 9 & 10, P'gh	2.55	2.55	2.55	2.65
Sheets, blue, 9 & 10, Chi-	2.60	2.60	2.60	2.70
cago dist. mill.....	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh....	2.45	2.45	2.45	2.55
Wire nails, Chicago dist.	3.25	3.25	3.25	3.35
Barbed wire, galv., P'gh..	3.30	3.30	3.30	3.40
Barbed wire, galv., Chi-	\$5.50	\$5.50	\$5.50	\$5.50
cago dist. mill.....				
Tin plate, 100 lb. box, P'gh				

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.	\$14.50	\$15.00	\$15.50	\$17.50
Heavy melting steel, Phila.	14.00	14.00	14.00	16.50
Heavy melting steel, Ch'go	11.50	11.75	12.25	13.00
Carwheels, Chicago.....	13.50	13.50	14.25	14.50
Carwheels, Philadelphia...	15.50	15.50	15.50	17.00
No. 1 cast, Pittsburgh....	14.75	14.75	15.00	16.00
No. 1 cast, Philadelphia...	16.50	16.50	16.50	17.50
No. 1 cast, Ch'go (net ton)	14.00	14.50	14.50	16.50
No. 1 RR. wrot. Phila....	15.50	15.50	15.50	17.00
No. 1 RR. wrot. Ch'go (net)	10.00	10.25	11.00	12.75

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt....	\$2.85	\$2.85	\$2.85	\$3.50
Foundry coke, prompt....	4.00	4.00	4.00	4.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.25	13.25	13.25	14.25
Electrolytic copper, refinery	13.00	12.95	13.00	13.87 1/2
Zinc, St. Louis.....	6.05	6.07 1/2	6.22 1/2	7.35
Zinc, New York.....	6.40	6.42 1/2	6.57 1/2	7.70
Lead, St. Louis.....	6.05	6.00	6.00	8.10
Lead, New York.....	6.25	6.25	6.25	8.35
Tin (Strait), New York...	58.02 1/2	58.50	61.50	70.50
Antimony (Asiatic), N. Y.	11.25	11.50	11.00	14.25

Pittsburgh

Steel Price Reductions Make Buyers More Conservative—Heavy Melting Scrap Declines 50c.

PITTSBURGH, Oct. 18.—Events of the week have not been of a character to cause the steel manufacturers to take a more cheerful view of the business situation. Where there has been any gain in orders, and such cases have been very few, it has not resulted in enlarged mill operations nor has it given any indication that buyers are departing from a day-to-day purchasing policy. Price uncertainty is general and even extends to pipe, which, until very recently, had shown no serious recessions from the price schedule that became effective April 19, 1923. The weakness that has developed in prices in the past few weeks is less the result of pressure exerted by buyers than of the competition between manufacturers for orders. Naturally, if prices decline through the activity of sellers, buyers feel that by waiting they will get further concessions, and there is no question that this consideration is partly, at least, responsible for continued dullness. No formal reduction in pipe prices has been made, but, through additions to the supplementary discounts, buyers are better off than they were recently by fully \$2 a ton.

So much irregularity and confusion exists as to prices of strip steel that business suffers. It is commonly observed that the recent reduction in sheet prices has not materially stimulated the demand, and if there has been a reaction among buyers to the revision in

prices of plates, shapes and bars of a few weeks ago, it has been to make them even more conservative.

There has been a tapering off in the activities of several of the more important steel-consuming industries as compared with the first half of the year, but there is still some doubt that the recession in consumption has been as great as that in the demand for and production of steel. In all probability consumption has held up rather better than is indicated by the rate of steel production since the middle of the year, while production in the fore part of the year was too large for the amount consumed at that time. The late adjustment of production to consumption accounts for the present rate of ingot output in this and nearby districts of somewhat under 55 per cent of capacity.

The dullness in steel, however, is mild in comparison with that in the primary materials. Pig iron sales in the past week have not exceeded 2000 tons, and more than half of that tonnage was taken by one buyer. Melters simply are not interested in scrap. In fuel, supplies are so plentiful in relation to the demand that it is not a question with producers of getting a profit so much as finding an outlet for their outputs.

Pig Iron.—The Westinghouse Electric & Mfg. Co. has finally closed for the foundry iron for which it inquired almost a month ago. The purchase amounted to 1200 tons, of which three producers got an equal share. The business was placed at the full market price of \$17.50, Valley furnace, for No. 2 grade, but the basis of the award was strictly one of reciprocity. A sale of 600 tons is also included in the week's business, this being a lot that was lying on the yards of the Clinton furnace, now being dismantled. To clean up this iron it was sold to a local sanitary ware manufacturer at \$17, Valley furnace, for No. 2 grade. Only carload lots of

Bessemer iron have been moved. No open market transactions in basic iron have been noted. The market is holding well on these several grades, but it is also a fact that the test of large inquiry is lacking. Low phosphorus iron is weaker, with Eastern iron of this grade now available at fully \$1 a ton under the quotation of the Valley producer.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free	27.50

Freight rate to the Pittsburgh or Cleveland districts, \$1.76.

Ferroalloys.—The recent report of an advance of \$5 a ton in British ferromanganese still lacks confirmation or explanation. The firm that announced the advance was cabled a tender of 200 tons for first quarter shipment at \$90, guaranteed against a decline. However, it would not accept the business for that delivery, but did take it for shipment over the remainder of this year. The market is still \$90, Atlantic seaboard, for either domestic or imported material and is not active, since consumers are well covered against their probable requirements for the next two months and are not yet much interested in 1928 supplies. Specifications on contracts for spiegeleisen are so much below quotas that there is more spot tonnage than can be readily absorbed except at easy prices. High grade ferrosilicon is moving fairly well. Makers are expected to extend the present price for 1928 tonnages, but have not yet started to solicit contracts.

Semi-Finished Steel.—The market for semi-finished steel is even quieter than that in the finished products and that indicates a light demand, seeing that the general average of finishing mill operations is hardly 65 per cent of capacity. Prices do not change, chiefly because consumer interest is so low that it is doubted that sales would be any larger at lower prices. Evidence is still lacking that wire rod users have been obliged to pay more than \$42, base Pittsburgh or Cleveland. Producers evidently are permitting buyers to draw against any tonnages not specified in third quarter contracts.

Bars, Plates and Shapes.—Mills have not abandoned efforts to establish 1.85c., base Pittsburgh, as the small-lot price, and in a few cases have been able to get that figure on contracts covering the remainder of the year. As a general proposition, however, 1.75c. is the prevailing price without much regard to the size of the tonnage ordinarily purchased by the buyer. The really large users of these products still have protection at less than 1.75c., and that price hardly will become effective with them during the remainder of this year. A fair amount of fabricated steel has come to local shops in the past week, but it was not equal to completed orders. Bar and plate business is very slow, and the leading producing company shut down two of its largest plate mills last week for an indefinite period. The low rate of production of bolt, nut and rivet makers and producers of cold-finished steel bars seriously affects specifications and orders for hot-rolled bars. A

new card of extras on bars, plates and shapes is being prepared by one company, according to reports.

Wire Products.—There has been no quickening of interest in the market on the part of jobbers, and quotations on nails and of other products the prices of which are governed by those on nails are still unrealized. Manufacturers do not seem to have cancelled unspecified tonnages on third quarter contracts carrying lower prices than now are quoted, and it still is an open question whether nails will be established at \$2.55, base, per keg, Pittsburgh, or recede to \$2.50, the billing price on current shipments. Spring dating terms on woven wire fence are effective Nov. 1 in the Northern half of the country.

Fencing for the game preserves in the new Allegheny County, Pa., parks will be furnished by the Cyclone Fence Co. About 75 tons of fencing and posts will be required.

Rails and Track Supplies.—Eastern railroads are still coming into the market for their 1928 requirements of standard-section rails, but as yet activity is lacking in track supplies, either currently or for 1928 delivery. Light-section rails are selling steadily enough, but the usual transaction covers a single carload. Small spikes are very dull. Mill prices are steady.

Tubular Goods.—The price situation, rather than the volume of business, attracts attention just now. Prices have been highly competitive for the past two months, but until about three weeks ago the leading interest did not recognize the concessions. Then it empowered its jobbers to meet competition within reasonable limits, and actual prices are still rather indefinite except possibly on oil country goods, on which the market appears quotable at the card discount plus 10 and 5 per cent on direct mill shipments and 10, 5 and 3 per cent beyond the card on shipments into jobbers' stocks. The nearest appraisal of line pipe prices is that besides the card discounts there is an additional 1 per cent and a string of fives. On standard-weight pipe an effort is being made to preserve the preferential discount of 1 per cent beyond the card and the supplementary of 5 per cent, but there are reports of supplementary discounts of 5 and 2½ per cent and even 5 and 5. Standard-weight pipe is moving fairly well, but lapwelded and seamless pipe are slow; seamless plants are running at only about 40 per cent of capacity and operations of welded pipe plants are barely over 50 per cent. Boiler tubes are only moderately active, while mechanical tubing is really dull.

Sheets.—Prices have given no more ground since last reports, but it is generally conceded that the recent reduction of \$2 a ton has not materially stimulated demand. Orders are fairly numerous, but individually they are small, and not much tonnage from the automobile industry is included. The American Sheet & Tin Plate Co. last week operated 67 per cent of its sheet mills, and the average of the industry as a whole is around that figure. Bookings of independent companies reporting to the National Association of Sheet and Tin Plate Manufacturers for the first half of October were about 4000 tons ahead of those for the same period last month.

THE IRON AGE Composite Prices

Finished Steel

Oct. 18, 1927, 2.307c. a Lb.

One week ago	2.331c.
One month ago	2.346c.
One year ago	2.453c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.	Jan. 4:	2.307c.	Oct. 18
1926	2.453c.	Jan. 5:	2.403c.	May 18
1925	2.560c.	Jan. 6:	2.396c.	Aug. 18
1924	2.789c.	Jan. 15:	2.460c.	Oct. 14
1923	2.824c.	Apr. 24:	2.446c.	Jan. 2

Pig Iron

Oct. 18, 1927, \$17.84 a Gross Ton

One week ago	\$18.09
One month ago	18.00
One year ago	19.71
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	\$19.71.	Jan. 4:	\$17.84.	Oct. 18
1926	21.54.	Jan. 5:	19.46.	July 13
1925	22.50.	Jan. 13:	18.96.	July 7
1924	22.88.	Feb. 26:	19.21.	Nov. 3
1923	30.86.	Mar. 20:	20.77.	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel		Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.80c.	
F.o.b. Chicago.....	1.85c.	
Del'd Philadelphia.....	2.07c. to 2.12c.	
Del'd New York.....	2.09c. to 2.14c.	
Del'd Cleveland.....	1.94c.	
F.o.b. Cleveland.....	1.75c.	
F.o.b. Birmingham.....	1.90c. to 2.05c.	
C.I.F. Pacific ports.....	2.35c.	
F.o.b. San Francisco mills.....	2.35c. to 2.40c.	
Billet Steel Reinforcing		
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.	
F.o.b. Birmingham.....	1.95c. to 2.05c.	
Rail Steel		
F.o.b. mill.....	1.65c. to 1.75c.	
F.o.b. Chicago.....	1.80c.	

Common iron, f.o.b. Chicago.....	1.85c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.07c. to 2.12c.
Common iron, del'd New York.....	2.09c. to 2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.80c.
F.o.b. Chicago.....	1.85c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del'd Cleveland.....	1.94c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.I.F. Pacific ports.....	2.30c. to 2.40c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.80c.
F.o.b. Chicago.....	1.85c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del'd Cleveland.....	1.94c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.I.F. Pacific ports.....	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh.....	2.15c. to 2.30c.
All gages, 6 in. to 12 in., P'gh.....	1.95c. to 2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net.....	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net.....	2.40c.
All gages, narrower than 6 in., Chicago.....	2.40c. to 2.50c.
All gages, 6 in. and wider, Chicago.....	2.20c. to 2.50c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports.....	\$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports.....	\$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, under 12 in., 3 tons or more, P'gh.....	3.00c.
Strips, under 12 in., 3 tons or more, Cleveland.....	3.00c.
Strips, under 12 in., 3 tons or more, del'd Chicago.....	3.30c.
Strips, under 12 in., 3 tons or more, Worcester.....	3.15c.
Strip-sheets, 12 in. and wider, Pittsburgh mill.....	3.00c.
Strip-sheets, 12 in. and wider, Cleveland mill.....	3.00c.
Strip-sheets, 12 in. and wider, del'd Chicago.....	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)		Base Per Keg
Wire nails.....		\$2.55
Galvanized nails.....		4.55
Galvanized staples.....		3.25
Polished staples.....		3.00
Cement coated nails.....		2.55
		Base Per 100 Lb.
Bright plain wire, No. 9 gage.....		\$2.40
Annealed fence wire.....		2.55
Spring wire.....		3.40
Gal'd wire, No. 9.....		3.00
Barbed wire, gal'd.....		3.25
Barbed wire, painted.....		3.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.		

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed		Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.10c. to 2.20c.	
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.30c.	
Nos. 9 and 10, del'd Philadelphia.....	2.47c. to 2.57c.	
Nos. 9 and 10, f.o.b. Birmingham.....	2.35c.	

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.90c.
No. 24, f.o.b. Chicago dist. mill.....	3.00c.
No. 24, del'd Philadelphia.....	3.22c.
No. 24, f.o.b. Birmingham.....	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.15c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.75c.
No. 24, f.o.b. Chicago dist. mill.....	3.85c.
No. 24, del'd Philadelphia.....	4.07c.
No. 24, f.o.b. Birmingham.....	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.15c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.20c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.....	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.40	25-lb. coating I.C. \$17.50
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series	Numbers	Base Per 100 Lb.
21.00*	($\frac{1}{2}$ % Nickel, 0.10% to 0.20% Carbon)	\$2.90 to \$3.00
2300	(3 $\frac{1}{4}$ % Nickel)	4.10 to 4.20
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.10 to 3.20
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.10 to 3.20
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.10 to 4.30
6100	(Chrom. Vanad. spring steel)	3.60 to 3.80
9250	(Silicon Manganese spring steel)	3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.).....		
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.10 to 4.30
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.10 to 3.20
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2 $\frac{1}{2}$ -in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Chgo mill.....	36.00

Track Equipment

	Base per 100 Lb.
Spikes, $\frac{3}{4}$ in. and larger.....	\$2.80
Spikes, $\frac{1}{2}$ in. and smaller.....	\$2.80 to 3.00
Spikes, boat and barge.....	8.10
Tie plates, steel.....	2.25
Angle bars.....	2.75
Track bolts, to steam railroads.....	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count, 70 per cent off list	

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld		Iron	
Steel	Galv.	Black	Galv.
Inches		Inches	
$\frac{1}{4}$	45	$\frac{1}{4}$ to $\frac{3}{8}$	+11 +39
$\frac{1}{2}$	51	$\frac{1}{2}$	22 2
$\frac{3}{4}$	56	$\frac{3}{4}$	28 11
1.....	60	1 to 1 $\frac{1}{2}$	30 13
1 to 3.....	62		

Lap Weld		Iron	
Steel	Galv.	Black	Galv.
2.....	55	2.....	23 7
2 $\frac{1}{2}$ to 6.....	59	2 $\frac{1}{2}$	26 11
7 and 8.....	56	3 to 6.....	28 13
9 and 10.....	46	7 to 12.....	26 11
11 and 12.....	53		

Butt Weld, extra strong, plain ends

$\frac{1}{4}$	41	24 $\frac{1}{2}$	$\frac{1}{4}$ to $\frac{3}{8}$	+19 +54
$\frac{1}{2}$	47	30 $\frac{1}{2}$	$\frac{1}{2}$	21 17
$\frac{3}{4}$	53	42 $\frac{1}{2}$	$\frac{3}{4}$	28 12
1.....	58	47 $\frac{1}{2}$	1 to 1 $\frac{1}{2}$	30 14
1 to 1 $\frac{1}{2}$	60			
2 to 3.....	61	50 $\frac{1}{2}$		

Lap Weld, extra strong, plain ends

2.....	53	42 $\frac{1}{2}$	2.....	23 9
2 $\frac{1}{2}$ to 4.....	57	46 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4.....	29 15
4 $\frac{1}{2}$ to 6.....	56	45 $\frac{1}{2}$	4 $\frac{1}{2}$ to 6.....	28 14
7 to 8.....	52	39 $\frac{1}{2}$	7 to 8.....	21 15
9 and 10.....	45	32 $\frac{1}{2}$	9 to 12.....	16 2
11 and 12.....	44	31 $\frac{1}{2}$		

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 to 5 and 5%, and on galvanized by 1 $\frac{1}{2}$ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by c. e. point with supplementary discounts of 5 and 5 $\frac{1}{2}$ %.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 $\frac{1}{2}$ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2 $\frac{1}{2}$ in.....	27	1 $\frac{1}{2}$ in.....	+18
2 $\frac{1}{2}$ to 3 in.....	37	1 $\frac{1}{2}$ to 1 $\frac{3}{4}$ in.....	+8
3 in.....	40	2 to 2 $\frac{1}{2}$ in.....	-2
3 $\frac{1}{2}$ to 3 $\frac{3}{4}$ in.....	42 $\frac{1}{2}$	2 $\frac{1}{2}$ to 3 in.....	-7
4 to 13 in.....	45	3 $\frac{3}{4}$ to 4 $\frac{1}{2}$ in.....	-9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.....	60	3 in.....	45
1 $\frac{1}{4}$ to 1 $\frac{1}{2}$ in.....	52	3 $\frac{1}{4}$ to 3 $\frac{3}{4}$ in.....	47
1 $\frac{1}{2}$ in.....	36	4 in.....	50
2 to 2 $\frac{1}{2}$ in.....	31	4 $\frac{1}{2}$, 5 and 6 in.....	45
2 $\frac{1}{2}$ to 3 in.....	39		

2 and 2 $\frac{1}{2}$ in.....	37	3 $\frac{1}{2}$ and 3 $\frac{3}{4}$ in.....	53
2 $\frac{1}{2}$ and 3 in.....	45	4 in.....	56
3 in.....	51	4 $\frac{1}{2}$, 5 and 6 in.....	51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

Tin Plate.—Current demands for tin plate are very small and, while mill operations are holding well to the recent gait, anticipated early 1928 tonnages, plus some export business for Japan, are largely responsible. All makers could do more business than they are doing, and buyers with early delivery business to place are uncovering a somewhat easier price situation than ruled at the beginning of the second half of the year.

Cold-Finished Steel Bars and Shafting.—There has been no appreciable increase in orders or specifications from the automobile builders or parts makers, and as other consuming industries, notably the agricultural implement manufacturers, appear to have bought their immediate requirements, the market is very slow. Producers are resisting price pressure, and on small-lot business 2.20c., base Pittsburgh, is holding well. A revision of extras is reported to be in preparation.

Cold-Rolled Strips.—There is still some confusion as to the base prices. At least two important producers are quoting 3c., base Pittsburgh or Cleveland, for lots of 3 tons or more, and are asking an extra of 25c. per 100 lb. for lots of less than 3 tons down to 1 ton. Others are quoting 3.25c., base, for lots of 1 to 3 tons, subject to a deduction of 25c. per 100 lb. for lots of 3 tons or more. The variation in the method of quoting means a difference of \$5 a ton to the buyers of lots of less than a ton, since a base of 3c. for 3 tons or more produces a price of 3.40c. for lots of 1999 lb. down to 1000 lb., while the extra of 40c. per 100 lb. added to the base of 3.25c. means 3.65c. for such quantities. It is probable that eventually all makers will go to the base of 3c. for lots of 3 tons or more and add the recent extras for smaller quantities. Business is still very dull, and sales are confined entirely to small lots for early shipment.

Shipments of all manufacturers in the past week have been approximately 55 per cent of capacity, or somewhat in excess of new business, which was slightly below 50 per cent of capacity.

Hot-Rolled Flats.—Some makers are finding bookings to be running somewhat ahead of those of the same period last month, but the more common report is that business suffers from the confusion that exists as to prices. Although there has never been formal adoption of a proposal that would make the amount of tonnage taken by the individual buyer over the past year the basis of the price to be charged, there has been some observance of that plan and producers have been obliged to overcome the resistance created by the appraisals buyers have made of their own importance in a tonnage way. Only the small-lot buyers are paying what are regarded as the regular price schedules of 2.10c., base, for wide and 2.30c., base, for narrow material.

Bolts, Nuts and Rivets.—Demand is still strictly hand-to-mouth, and while makers are well supplied with fourth quarter contracts, the specifications are light and the industry is not operating at more than 50 per cent of capacity. In announcing fourth quarter prices

on large rivets, makers gave buyers until Oct. 20 to sign and return contracts at \$2.75, base, after which the price was to go to \$3.

Warehouse Business.—Jobbers have generally reduced sheet prices \$2 a ton in keeping with the recent mill reduction. The scheduled prices otherwise are unchanged, but, as has been true for some time, they are subject to concessions, particularly on steel bars. Warehouse business generally is slow.

Coke and Coal.—Offerings of both coal and coke are still too large for the demand, and prices are low and easy. The best furnace coke cannot be sold at more than \$3 per net ton at ovens, with good brands readily obtainable at 15c. per ton less. The higher-priced foundry cokes are feeling the effect of the fact that selected 40-hr. coke is being offered at such low prices that many foundries are substituting it for standard 72-hr. fuel. The difficulty that attends marketing the present output of coal redounds to the advantage of buyers. Coal operators in this part of the country regard the union miners' strike as a thing of the past, despite the threats of union leaders to make a drive against them. The strike settlement in Illinois seems much less of a union victory than it appeared to be at first, since it is now said that only about 40 per cent of the capacity that was idle before the settlement has since resumed. As the settlement merely covers a period to Feb. 1, it is considered likely that there will be a repetition of recent conditions after that date.

Old Material.—There is still too little business to definitely establish prices for scrap iron and steel. Dealers are offering \$14.50 for heavy melting steel, and while they are not getting much at that price, since the output of that grade is very light, they appear to be the only outlet for the small amount of material that is reaching the market. No sales to consumers are noted at less than \$15. The quotable market is \$14.50 to \$15. Steel foundry grades are weaker, and in other directions prices show the uncertainty that usually accompanies a slow demand.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:

Heavy melting steel.....	\$14.50 to \$15.00
Scrap rails	14.00 to 14.50
Compressed sheet steel.....	14.50
Bundled sheets, sides and ends...	13.50
Cast iron carwheels.....	15.00
Sheet bar crops, ordinary.....	15.00 to 15.50
Heavy breakable cast.....	13.75 to 14.00
No. 2 railroad wrought.....	14.50 to 15.00
Heavy steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	11.50 to 12.00

Acid Open-Hearth Furnace Grades:

Railroad knuckles and couplers..	16.00 to 16.50
Railroad coil and leaf springs...	16.00 to 16.50
Rolled steel wheels.....	16.00 to 16.50
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate.....	18.50 to 19.00
Low phosphorus, light grade.....	17.00 to 17.50
Low phosphorus sheet bar crops...	18.00 to 18.50
Heavy steel axle turnings.....	13.50 to 14.00

Electric Furnace Grades:

Low phosphorus punchings.....	16.75 to 17.00
Heavy steel axle turnings.....	13.50 to 14.00

Blast Furnace Grades:

Short shoveling steel turnings...	11.50 to 12.00
Short mixed borings and turnings	11.00
Cast iron borings.....	11.00
No. 2 busheling.....	10.00 to 10.50

Rolling Mill Grades:

Steel car axles.....	19.00 to 19.50
No. 1 railroad wrought.....	12.00 to 12.50

Cupola Grades:

No. 1 cast.....	14.75 to 15.75
Rails 3 ft. and under.....	15.00 to 15.50

Malleable Grades:

Railroad	15.00
Industrial	14.50
Agricultural	14.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.20c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 62½ per cent off list	
Machine bolts, per 100 count, 62½ per cent off list	
Carriage bolts, per 100 count, 62½ per cent off list	
Nuts, all styles, per 100 count, 62½ per cent off list	
Large rivets, base per 100 lb.....	\$3.50
Wire, black soft annealed, base per 100 lb..	2.90
Wire, galvanized soft, base per 100 lb.....	2.90
Common wire nails, per keg.....	\$2.80 to 2.90
Cement coated nails, per keg.....	2.85 to 2.95

Spiegeleisen Imports This Year Larger

Imports of spiegeleisen into the United States have been fairly large thus far this year. To Aug. 1, the latest official date, 5325 gross tons or 760 tons per month has been imported. In 1926 there were 8783 tons imported or 732 tons per month. The largest importations thus far this year were 2195 tons in May, 1330 tons in July, 1075 tons in June, 675 tons in April and 50 tons in January. Most of this material is of British origin, but some is received from Germany and the Netherlands.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and in- cluding 1½-in.	\$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars	
	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs	
	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp	
	Per Lb.
Grooved	1.75c. to 1.85c.
Sheared	1.75c. to 1.85c.
Universal	1.75c. to 1.85c.

Wire Rods	
	Per Gross Ton
*Common soft, base.....	\$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40% ..	3.00 per ton over base
Carbon 0.41% to 0.55% ..	5.00 per ton over base
Carbon 0.56% to 0.75% ..	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$43 to \$44. Cleveland mill base, \$40 to \$42.

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.50c.
Iron ore, Swedish, average 66% iron, 9.75c. to 10.00c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	39c. to 40c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.10 to \$10.35
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ delivered	50c. to 55c.

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.85 to \$3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Chgo ovens Foundry, by-product, New Eng- land, del'd	9.75 12.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.46 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis....	9.75

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.65 to 1.85
Mine run gas coal, f.o.b. Pa. mines ..	1.85 to 2.00
Steam slack, f.o.b. W. Pa. mines....	1.05 to 1.15
Gas slack, f.o.b. W. Pa. mines....	1.25 to 1.40

Ferromanganese	
	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$30.00 to \$31.00
Domestic, 16 to 19%	29.00 to 30.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$85.00 to \$87.50
75%	145.00

Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
Per Gross Ton Furnace	
12%	\$39.00
14 to 16%	\$45 to 46.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$32.00
11%	34.00
	Per Gross Ton
12%	\$36.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$25.00
7%	26.00
8%	27.00
9%	28.00
	Per Gross Ton
10%	\$30.00
11%	32.00
12%	34.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal, del'd	93c. to 95c.
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. deliv- ered, in carloads.....	1.50c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. An- niston, Ala., per net ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$16.00 to \$16.50
No. 2 lump, Illinois and Kentucky mines..	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay	
	Per 1000 f.o.b. Works
	First Quality Second Quality
Pennsylvania ...	\$43.00 to \$46.00 \$35.00 to \$38.00
Maryland	43.00 to 46.00 35.00 to 38.00
New Jersey ...	50.00 to 65.00
Ohio	43.00 to 46.00 35.00 to 38.00
Kentucky	43.00 to 46.00 35.00 to 38.00
Missouri	43.00 to 46.00 35.00 to 38.00
Illinois	43.00 to 46.00 35.00 to 38.00
Ground fire clay, per ton	7.00

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagon....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including
¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E. 70	70
Stove bolts in packages.....	80, 10 and 5
Stove bolts in bulk.....	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts
applies on carload business. For less than car-
load orders discounts of 55 to 60 per cent apply.

Large Rivets	
	Base per 100 Lb.
(½-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.75
F.o.b. Chicago	2.85 to 3.10

Small Rivets	
	(¾-In. and Smaller)
	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws	
	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)
	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Rail Releases Cause Increase in Ingot Output—Pig Iron Drops \$1

CHICAGO, Oct. 18.—Developments in the iron and steel market center in prices rather than in the demand from consuming interests. Lower prices have served more to emphasize the competitive condition of the market rather than to lead the way to an increased volume of orders. Mill rolling capacity is engaged at an unchanged rate. With the general manufacturing lines less busy, the demand for soft steel bars is lighter, and many users find that orders placed for what they had estimated to be their requirements for 30 to 45 days are now spreading out their shipping orders. Although the threat of a further cut in mill prices for plates, shapes and bars is not serious, nevertheless local producers are not in all cases willing to adhere strictly to the Chicago district price level where competition from the East is encountered.

Releases against recent rail contracts have resulted in one mill increasing ingot output to 75 per cent of capacity, bringing production in this district to an average of slightly less than 65 per cent. The Chicago, St. Paul, Minneapolis & Omaha has withdrawn its inquiry for 250 hopper car bodies and will buy the same number of new cars instead. The equipment building program that is now under way at the Superior, Wis., shops of the Great Northern includes 2500 grain box cars, 200 flat cars and 25 caboose underframes. The first boat shipment of steel, 5000 tons, to be used in building the cars has arrived at Duluth from Buffalo.

Pig Iron.—A reduction of \$1 a ton has brought No. 2 foundry iron to \$18.50, f.o.b. local furnace. Reports that \$18 has been done appear to find their only basis in the resale of two carloads at that figure. The new prices have had very little effect on buying, though here and there a melter shows some interest in requirements for the remainder of this year and the first few months of 1928. A Chicago user is inquiring for 1000 tons of foundry iron, and 500 tons of No. 2 iron for first quarter delivery is pending. Producers expect that the new price level will restore to them a part of the outlying territory that has been lost in recent months because of the spread between prices here and in nearby markets. Another effect will be to narrow profits on boat iron, which is still being brought in by brokers and by a steel company from Lake Erie ports. The silvery market is off \$1.50 to \$2 a ton. It is reported here that a third furnace will soon start to produce this commodity. Orders are said to have been taken against this move, which would increase output by 50 per cent.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.64
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	\$30.50 to 31.00
Silvery, sil. 8 per cent	31.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Spiegeleisen is weak. Quotations of \$31, Hazard, Pa., have been made on carload lots of the 19 to 21 per cent grade, and large tonnages are being solicited at \$30. As a whole this market is dull.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$37.76 to \$38.76.

Plates.—New business is unusually light, and competition for going tonnages is keen. In and near Chicago 1.85c. is holding well, except on large orders for fabrication into tanks and for delivery to the Southwest. To the west of Chicago small orders have been taken at concessions of as much as \$2 a ton below the market. New business from tank builders is small, but

specifications against recent contracts total not less than 2500 tons. Little can be looked for in the way of tonnage from railroad car builders. Car shop operations are low, and current repair work and such few small orders as are being placed are not releasing enough steel materially to affect mill rolling schedules. The Chicago, North Shore & Milwaukee has ordered one parlor car, two diners and 15 coaches from the Pullman Car & Mfg. Corporation.

Mill prices on plates per lb.: 1.85c., base, Chicago.

Structural Material.—A contract for 1300 tons of steel for an apartment building has been awarded to a local fabricator. Other orders were of less than 100 tons each and afforded little in the way of encouragement to shops, many of which are operating at less than 30 per cent of capacity. It is reported that the local Medinah Athletic Club project will be held up a second time because of revisions in plans. Bids are in on the Shedd Aquarium, Chicago, and it is probable that the award will be made in the next few days. In the absence of business in sufficient volume to permit shops to operate at a rate expected at this time of the year, competition for going business is keen and higher prices are not now in sight. Although some fabricators are keeping moderate stocks, present practice is to order steel from mills as fabricating contracts are placed. This method is entirely satisfactory from the viewpoint of deliveries, and some work is saved in the shops by ordering much of the material cut to the proper length for fabrication. Demand from the manufacturing trade for shapes is less active than at any time this fall. Going mill prices for ordinary lots of plain material are lacking in strength at 1.85c., Chicago.

Mill prices on plain material per lb.: 1.85c., base Chicago.

Sheet Bars.—Specifications for this commodity are the heaviest since last June. Prices are steady at \$34 a gross ton at mills.

Billets.—Forging billets are commonly quoted at \$38 a gross ton at local mills. Both specifications and new business in billets are in smaller volume as a result of the reduced requirements of automobile parts manufacturers.

Bars.—New business in soft steel bars, following a fairly active market a week ago when the decline in prices was halted at 1.85c., Chicago, has again slumped. Producers have backlogs of two to four weeks, but they are still dependent on daily orders to keep rolling schedules on anything like a satisfactory basis. With the slowing down in the rate of automobile manufacture, the farm implement trade definitely takes the lead in consumption of bars made from billets. The demand for farm equipment is holding up well and manufacturers' order books give promise of well balanced operations until the end of the year. A few scattered sales in iron bars have definitely established the market at 1.85c., Chicago, though here and there 1.90c. is being asked on less desirable business. Specifications for alloy steel bars have changed little in volume, and production in this district is between 65 and 70 per cent of mill capacity. New buying of rail steel bars is of fair proportions, following price reductions to 1.80c., Chicago, on all except two or three sections, on which 1.85c. to 1.90c. is still being asked. Specifications are smaller and have fallen below production, which is being held steady to expand stocks of fence post material. The bed industry does not seem able to recover from its recent slump, and other industries, with the exception of farm equipment manufacturers, are using less rail steel. Demand for fence posts is expanding slowly, but is not yet large enough to pull shipments in line with production.

Mill prices per lb.: Soft steel bars, 1.85c., base, Chicago; common bar iron, 1.85c., base, Chicago; rail steel bars, 1.80c., base, Chicago.

Sheets.—Chicago mills have met competition in sheets by reducing prices \$1 to \$2 a ton. The new quotations are 2.30c., base mill, for blue annealed, 3c. for black and 3.85c. for galvanized sheets. The scramble for going business is not at an end, and the new prices are leaning heavily toward the weak side. In some instances Eastern producers have met the new schedule with prices that are still more attractive to buyers. The result is that competition is no less se-

vere than it was a week or two ago, and the reductions have not brought more business into the market. Hot mill output in this district ranges from 75 to 80 per cent of capacity, and is sustained almost wholly by purchases at extremely close range. Deliveries range from prompt to two weeks, depending on the product.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bolts, Nuts and Rivets.—In this market, sellers are encountering some resistance to prices, which have not been lowered in sympathy with the new quotations on bars and rods. Specifications are in smaller volume, and production has dropped to less than 55 per cent of capacity.

Reinforcing Bars.—Among the outstanding recent awards in this district are 425 tons for a motor car sales building in Chicago and 535 tons for an apartment building in Milwaukee, Wis. Fresh inquiry is in smaller volume, partly because of a seasonal decline in building and also because of a check on loans by financing organizations. Old inquiries are moderately active, and several general contracts, including the Kelly High School, Chicago, which calls for 400 tons, have been let. There is a varying degree of activity in architects' offices, with indications that many of the plans now being prepared are of a highly speculative character. Bending shop operations are holding momentarily at 60 per cent of capacity, but it is generally agreed that they will be lower before the end of the month. Reinforcing bars made from billet stock are quoted at 2.20c. to 2.65c., Chicago warehouse. Prices on rail steel range from 1.90c. to 2c., per lb., Chicago.

Wire Products.—Shipments so far in October have been a trifle heavier than in late September, and this fact, combined with the necessity of keeping stocks well balanced, has made it essential that mill output be increased, the current rate being between 60 and 65 per cent of capacity. Demand from jobbers in the Southwest has fallen off, while in the Northwest it is slightly better. Business in the South is steady and large for this time of the year. Orders from jobbers in the coal mining districts of the Middle West are more numerous and business in those sections is expected to improve as more mines resume production. Open fall weather is serving to prolong the seasonal demand for nails. Specifications and orders from the manufacturing trade are less numerous, and the railroads are taking only current requirements. Mill prices for wire and wire products are shown on page 1111.

Rails and Track Supplies.—The Union Pacific has ordered 30,000 tons of standard-section rails, of which 13,000 tons was taken by the Illinois Steel Co., 13,000 tons by the Colorado Fuel & Iron Co., and 4000 tons by the Inland Steel Co. Inquiry now before the trade includes 190,000 tons for both the United States and Canadian lines of the New York Central, 12,500 tons for the Missouri-Kansas-Texas and 10,000 tons for the Grand Trunk Western. In accessories the Union Pacific has purchased about 3000 tons, but the Santa Fe inquiry is still before the trade. Production of track supplies ranges from 30 to 40 per cent of capacity, tie

plates being at the lowest and spikes and bolts at the highest rate. Chicago mills have booked about one-third of the track supply tonnage recently purchased by the Pennsylvania. A number of small lots of light rails have been placed, making this week one of the most active in this commodity in many months.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36. Per Lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Cast Iron Pipe.—This market is more active, particularly in orders placed by contractors, who know that the end of pipe-laying operations in the North Central States is not far ahead. The purchase of 3300 tons of pipe by St. Clair Shores, Mich., has been deferred for a week or 10 days. Fresh inquiry includes 3600 tons of 12-in. Class C pipe for Detroit, 110 tons of 6-in. Class B pipe for Muskegon, Mich., and 350 tons of 6-in., 215 tons of 8-in. and 275 tons of 12-in. Class C pipe for Evansville, Ind. Recent sales have not developed any change in the general price level.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$34.20 to \$37.20; 4-in., \$38.20 to \$41.20; Class A and gas pipe, \$4 extra.

Old Material.—The price structure in this market appears to have no stability, and sellers are taking business at 25c. to 50c. below the level of a week ago. Railroad shipments are heavy, and consumers will buy only small and scattered tonnages, leaving the bulk of scrap now moving to go through the channels of previous contracts. Sales of heavy melting steel in recent months have been much smaller than was the case at the beginning of the year. Large users are disposed to buy more often and in smaller quantities. A sale this week of 1000 tons brought \$12 per gross ton, delivered, and other users have named that price as the one which they think is in keeping with the market. Lower prices have induced some buying, and so far outlets have been found for incoming scrap, but it is evident that this process cannot continue in the face of steady shipments into the market and a shrinking demand.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$11.50 to \$12.00
Shoveling steel.....	11.50 to 12.00
Frogs, switches and guards, cut apart, and miscellaneous rails.....	12.75 to 13.25
Hydraulic compressed sheets.....	10.00 to 10.50
Drop forge flashings.....	9.00 to 9.50
Forged, cast and rolled steel car-wheels.....	14.50 to 15.00
Railroad tires, charging box size.....	14.50 to 15.00
Railroad leaf springs, cut apart.....	14.50 to 15.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles.....	13.00 to 13.50
Coil springs.....	14.75 to 15.25
Low phosphorus punchings.....	13.75 to 14.25
Electric Furnace Grades:	
Axle turnings.....	11.50 to 12.00
Blast Furnace Grades:	
Axle turnings.....	10.50 to 11.00
Cast iron borings.....	10.00 to 10.50
Short shoveling turnings.....	10.00 to 10.50
Machine shop turnings.....	7.00 to 7.50
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.....	14.75 to 15.25
Angle bars, steel.....	13.50 to 14.00
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad.....	13.00 to 13.50
Agricultural.....	12.75 to 13.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.....	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.....	13.50 to 14.00
Iron arch bars and transoms.....	18.00 to 18.50
Iron car axles.....	20.00 to 20.50
Steel car axles.....	16.25 to 16.75
No. 1 railroad wrought.....	10.00 to 10.50
No. 2 railroad wrought.....	10.00 to 10.50
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	4.75 to 5.25
Locomotive tires, smooth.....	13.00 to 13.50
Pipes and flues.....	7.50 to 8.00
Cupola Grades:	
No. 1 machinery cast.....	14.00 to 14.50
No. 1 railroad cast.....	13.00 to 13.50
No. 1 agricultural cast.....	13.00 to 13.50
Stove plate.....	12.25 to 12.75
Grate bars.....	10.75 to 11.25
Brake shoes.....	10.25 to 10.75
*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.	

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.20c. to 2.65c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.95c.
Galvanized sheets (No. 24).....	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank.....	60
Hot-pressed nuts, hexagons, tapped or blank.....	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

New York

Fresh Weakness in Pig Iron—Merchant Pipe Discounts Revised

NEW YORK, Oct. 18.—Fresh weakness has cropped out in pig iron prices, after several weeks in which the market has been comparatively steady, but quiet. On a sale of 2000 tons of No. 2 plain foundry in eastern Pennsylvania, the first real test of prices in some time, the seller quoted \$20, delivered, which, after deducting the freight, is equivalent to \$15.59, Buffalo. Another tonnage was taken in the same section by an eastern Pennsylvania producer at the same delivered price. Since the freight rate to the nearest producing point is \$1.26, the quotation figures back to \$18.74, eastern Pennsylvania furnace. While sales in the New York district have been individually small, the largest amounting to about 600 tons, the waiving of silicon differentials on Buffalo iron has been reported in one or two cases. Total sales by local brokers during the week slightly exceeded 6000 tons. The General Electric Co. has closed for a total of 750 tons, of which 100 tons is for Schenectady, N. Y., and the remainder for Everett and Lynn, Mass. Current inquiry is light, and it is felt that a real buying movement will not develop for five or six weeks. There is not yet any real interest in first quarter requirements, although a New England melter has put out a tentative inquiry for 2000 tons for that delivery. The Troy, N. Y., furnace is expected to be blown out today or tomorrow.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail).....	\$21.41 to \$21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn).....	19.00 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	20.39 to 21.52
East. Pa. No. 2 fdy., sil. 2.25 to 2.75.....	20.89 to 22.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	21.39 to 22.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Ferroalloys.—Business in ferromanganese is confined to carload and small lots, with some sales and inquiries reported. The same is true of spiegeleisen. Prices are unchanged in both markets. Specifications on contract are reported better this month than in the last three months.

Finished Material.—Letting of the contract for the Hudson River bridge, involving 100,000 tons of steel, was the outstanding feature of this market in the last week. Of this total approximately 56,000 tons of fabricated structural steel went to the McClintic-Marshall Co. and of the remainder, which was taken by the John A. Roebling's Sons Co., 31,000 tons was wire cable and 13,000 tons was miscellaneous represented by special structural material, cast iron, cast steel, wire rope and other products. The market as a whole, however, is unseasonably quiet, and while business during the first half of October has been at an equivalent, and perhaps at a somewhat better rate, than was the case during September, there is little to indicate the improvement which is expected at this time in the year. Prices on structural shapes and plates are becoming somewhat better established at a minimum of 1.75c., Pittsburgh, but there has been little heavy tonnage business to test the market. Occasional sales are reported at 1.80c., Pittsburgh, but this represents the top of the price range on bars as well as on plates and shapes. Buying is done only for immediate requirements, and while there are several desirable structural tonnages under negotiation, actual bookings are somewhat below the average of recent months. A weakness of several weeks' standing on standard merchant pipe has been recognized by the leading maker by the granting of two 5 per cent discounts, instead of one, on the general run of business and independent makers are meeting this revision. Orders for standard pipe are coming in at a fair rate, but buying for lap-weld material is practically non-existent. Some further price weakness has developed on sheets. While 3.75c., Pittsburgh, can still be said to represent the market for galvanized sheets, sales to jobbers are reported to have been made by some of the smaller mills at concessions

of as much as \$2 a ton. Likewise 2.85c. has been done on black sheets for jobber consumption, but 2.15c. seems to be the minimum on blue annealed material. On hot-rolled strip it is not difficult to maintain 2.10c., Pittsburgh or Cleveland, on the wider sizes when the order is small, but concessions of from \$1 to \$2 a ton from the quoted price of 2.30c. on the narrower width are being made rather freely on the general run of business. The quoted schedule of prices on alloy steel is being adhered to, but business, which is never extensive in this territory, has declined to unusually small proportions.

Mill prices per lb. delivered New York: Soft steel bars, 2.09c. to 2.14c.; plates, 2.09c. to 2.14c.; structural shapes, 2.09c. to 2.14c.; bar iron, 2.09c. to 2.14c.

Warehouse Business.—October seems to have shown the usual seasonal improvement over September with most jobbers, but business is still confined to small orders. Plates, shapes and bars are in moderate demand

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.

Cold-finished shafting and screw stock—

Rounds and hexagons.....	4.00c.
Flats and squares.....	4.50c.

Cold-rolled strip, soft and quarter hard,

	5.75c. to 6.25c.
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Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage).....	3.89c.
Long terme sheets (No. 24 gage).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galvanized annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.

Smooth finish, 1 to 2½ x ¼ in. and larger

	3.65c.
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Open-hearth spring steel bases.....

	4.50c. to 7.00c.
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Machine bolts, cut thread: Per Cent Off List

¾ x 6 in. and smaller.....	.55 to .60
1 x 30 in. and smaller.....	.50 to .50 and 10

Carriage bolts, cut thread:

½ x 6 in. and smaller.....	.55 to .60
¾ x 20 in. and smaller.....	.50 to .50 and 10

Coach screws:

½ x 6 in. and smaller.....	.55 to .60
1 x 16 in. and smaller.....	.50 to .50 and 10

Boiler Tubes— Per 100 Ft.

Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
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½-in. butt.....	46	29
¾-in. butt.....	51	37
1-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
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Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
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Nos. 18 to 20.....	3.90c. to 4.00c.
No. 22.....	4.05c. to 4.15c.
No. 24.....	4.10c. to 4.20c.
No. 26.....	4.20c. to 4.30c.
No. 28*.....	4.35c. to 4.45c.
No. 30.....	4.60c. to 4.70c.

Sheets, Galvanized

	Per Lb.
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No. 14.....	4.35c.
No. 16.....	4.45c.
No. 18.....	4.50c. to 4.60c.
No. 20.....	4.65c. to 4.75c.
No. 22.....	4.70c. to 4.80c.
No. 24.....	4.85c. to 4.95c.
No. 26.....	5.10c. to 5.20c.
No. 28*.....	5.35c. to 5.45c.
No. 30.....	5.75c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

from stock, and prices are showing slightly more firmness. Sheets, however, are often subject to concessions, so that on black 4.10c. to 4.20c. per lb., base, is a fair estimate of the current market and in a few instances there have been isolated sales of galvanized sheets at less than 4.85c. per lb., base, although the market is still quotable at 4.85c. to 4.95c. per lb. Bolt and screw discounts continue unchanged, but the market is not particularly strong.

Cast Iron Pipe.—The low prices that have prevailed recently are becoming less common and although \$28 per net ton, base Birmingham, and less can still be obtained, the market is showing a slight undercurrent of strength. An additional feature has been the increase in demand from private gas and water companies, so that there is a fair-sized total of tonnage under inquiry. Bids were opened Oct. 17 by Mount Kisco, N. Y., on about 1000 tons of 16-in. water pipe. Phoenixia, N. Y., will open bids Oct. 21 on about 400 tons of water pipe. Inquiries in the market from private companies run to considerably larger totals.

Prices per net ton delivered New York: Water pipe 6-in. and larger, \$36.25 to \$37.25; 4-in. and 5-in., \$41.25 to \$42.25; 3-in., \$51.25 to \$52.25; Class A and gas pipe, \$4 to \$5 extra.

Old Material.—Prices on all grades of scrap are substantially unchanged, with brokers securing sufficient material to cover their contracts, but not enough to warrant lower offers. Yard grade of heavy melting steel is moving to Pottsville, Pa., at \$10.50 per ton, delivered, and to a consumer at Phoenixville, Pa., at \$11, delivered. No. 1 heavy melting steel continues firm at \$13.50 per ton, delivered, and purchases are being made for delivery to consumers at Bethlehem and Coatesville, Pa., and Claymont, Del. Borings and turnings are unchanged at \$10 per ton, delivered Bethlehem, Pa. Machine shop turnings are quoted by brokers at \$11 per ton, Phoenixville, and forge fire at \$10.50 per ton, Coatesville. Cast borings are being purchased at \$11 per ton, delivered to a Pencoyd, Pa., user. Steel mill stove plate is unchanged at \$12.50 per ton, Phoenixville, with foundry stove plate quoted at \$11 to \$11.50 per ton, delivered to nearby foundries.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	6.75 to 7.50
No. 1 heavy breakable cast.....	11.50 to 12.50
Stove plate (steel works).....	9.00
Locomotive grate bars.....	8.75 to 9.25
Machine shop turnings.....	7.00 to 7.25
Short shoveling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	7.25 to 7.50
Mixed borings and turnings.....	6.50 to 7.50
Steel car axles.....	16.25 to 17.25
Iron car axles (nom.).....	23.50 to 24.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	9.00 to 9.25
Forge fire.....	6.50 to 6.75
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	10.25 to 10.75
Cast iron carwheels.....	11.50 to 12.00
Stove plate (foundry).....	9.00 to 9.50
Malleable cast (railroad).....	10.25 to 10.75
Cast borings (chemical).....	11.50 to 12.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.00

Reinforcing Bars.—Low bidders have been announced on the concrete decks for the two bridges connecting Staten Island and New Jersey, which will require approximately 1800 tons of reinforcing bars. This brings the total of pending work on large jobs alone in the metropolitan district to nearly 5000 tons. Following two weeks of increased activity, lettings in the last few days have been rather light. Distributors are now quoting bars at 2.20c., Youngstown warehouse, or 2.57½c., delivered New York, a decrease of \$2 a ton. The New York warehouse price is unchanged at 2.95c., delivered at job, and the mill price remains at 1.85c., Pittsburgh.

Coke.—The market is without feature unless the almost total lack of interest in spot shipments might be considered as such. The situation has changed little in the past week, with furnace coke selling at \$2.75 to \$3 per ton, Connellsville, for immediate shipment. The standard foundry grade is quotable at \$4 to \$4.25, Connellsville, but an adequate test of prices

is lacking for both grades. Delivered prices on Connellsville foundry coke are: To northern New Jersey, \$8.03 to \$8.28; to New York or Brooklyn, \$8.79 to \$9.04; to Newark or Jersey City, N. J., \$7.91 to \$8.16. By-product coke continues to range from \$9.46 per net ton for West Virginia coke to \$9.59 and \$10.77 per net ton for local production, delivered Newark or Jersey City.

Cleveland

Concessions on Hot and Cold Strip—Wire Rods and Silvery Iron Lower

CLEVELAND, Oct. 18.—Some reports indicate a more optimistic feeling among consumers, but this has not been reflected in any gain in orders for finished steel. Sales continue light and are limited to small lots. There are no evidences of increased operations by consuming industries in this territory. Conditions in the automotive industry show no improvement. Motor car builders in Michigan are reducing their stocks and are buying only in small lots. The Ford Motor Co. has released some specifications to forge shops in this territory, but not in sufficient volume to indicate that it is ready to start making its new models on a production basis.

Price irregularities have developed on hot-rolled strip steel, and some shading is reported on cold-rolled strip. Wire rods have been reduced \$2 a ton in this market. Sheets have generally settled down \$2 a ton, following the recent price reduction. Steel bars, plates and structural material are firm at 1.75c., Pittsburgh, with no effort to get a higher price for small lots. The local mill price on steel bars is steady at 1.75c., Cleveland.

There is a fair amount of activity in the building field. Awards during the week included 2000 tons for viaduct work in Cleveland in connection with the Union Terminals project.

Iron Ore.—A few sales have been made recently in lots up to 20,000 tons to fill out mixtures, and the purchase of 50,000 tons is reported for an Ohio furnace that is expected to be blown in during the winter. On the other hand, a few steel companies have cut down shipments on their contracts, as they find that their purchases have been in excess of their requirements for the winter. Several ore firms have little more ore to ship this season. The season's shipments by water, according to late estimates, will be between 52,000,000 and 53,000,000 tons, or 85 to 90 per cent of the water shipments last year.

Pig Iron.—While the market is not showing much life, sellers continue to take a fair number of small-lot orders either for fill-in purposes or from foundries that are buying iron only as it is needed. Sales by Cleveland interests during the week aggregated 10,000 tons, or about the same as during the previous week. There is little change in shipping orders, which are fair, and most producers are shipping as much iron as they are making. The Lake furnace price appears to be holding rather steadily at a \$17 minimum for foundry and malleable iron, but there seems to be less effort than recently to get \$17.50. The market for Cleveland delivery is untested at \$18.50, furnace. However, there is evidently some pressure from local buyers for a

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.30c. to 4.65c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

price reduction. For Michigan delivery \$18, furnace, is the ruling quotation. A Buffalo producer has commenced the manufacture of silvery iron running from 8 to 9 per cent in silicon and has taken some business in Michigan at a base price of \$28.50, Jackson, Ohio. This iron when sold for Michigan delivery, is shipped by water to Detroit. The Michigan automobile plants are large consumers of silvery iron, and the Buffalo interest evidently proposes to compete with the southern Ohio silvery producers for Michigan business. Low phosphorus iron is inactive and can now be bought at \$27, Ohio furnace.

Jackson County producers Monday reduced prices \$1.50 a ton on Ohio silvery iron running from 5 to 8 per cent silicon and \$2 a ton on 9 per cent and higher silicon silvery and on Bessemer ferrosilicon.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$19.00
Southern fdy., sil. 1.75 to 2.25.....	23.25
Malleable	19.00
Ohio silvery, 8 per cent.....	30.00
Basic, Valley furnace.....	17.00
Standard low phos., Valley furnace.....	27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Semi-Finished Steel.—A price concession of \$3 a ton, or to \$40, Cleveland, has appeared on wire rods. This is understood to have originated in the Youngstown district in connection with business to be placed in Cleveland. Sheet bars are steady at \$34, Cleveland and Youngstown. Consumers are specifying in small lots for immediate needs, and aggregate business is light.

Sheets.—The recent \$2 a ton price reduction has done little to stimulate business, and sales continue light. On black sheets 2.90c., Pittsburgh, has become the only going price. There is still some effort to get 2.25c. for blue annealed sheets in widths of 36 in. and wider that are not affected by strip mill competition, but 2.15c. is by far the more common price for all widths and a price of 2.10c. is reported on strip mill widths. A movement is on foot to eliminate the special classification of stripsheets for cold-finished material 12 in. wide and wider produced on strip mills, and a leading producer has ceased designating this material as stripsheets, having restored it to the sheet mill classification with the regular blue annealed extras.

Hot-Rolled Strip Steel.—The price situation on this product is so unsettled that there is virtually an open market. Quantity price differentials are not being maintained, buyers who do not use enough material to come under the preferred customer classification under the quantity differentials being able to secure concessions of \$3 a ton from the prices of 2.10c. for wide and 2.30c. for narrow material. Some small lots are bringing the regular prices, but the aggregate of business closed is light.

Cold-Finished Steel Bars.—New size price differentials on hexagon cold-finished bars, reducing the present extras on nut sizes of from $\frac{3}{8}$ to $1\frac{1}{2}$ in. from \$1 to \$4 a ton, have been adopted by leading manufacturers, effective Oct. 17. Extras on very small and very large hexagons are not changed. By the readjustment manufacturers are passing along to consumers benefits that they have derived from the price reduction on hot-rolled bars. Some modifications of present quantity differentials are under consideration with a view to aiding the jobbers. While some shading is reported, cold-finished steel bars are holding fairly well at 2.25c., Cleveland.

Cold-Rolled Strip.—Some price irregularity is reported on cold-rolled strip, with quotations of 2.90c., Cleveland and Pittsburgh, for lots of 3 tons and over, although most producers are still holding to 3c. Fender stock has declined to 4.50c. for 17 to 21 gage inclusive, as compared with the recently prevailing price of 4.75c. New business is light.

Reinforcing Bars.—Small lots are in fair demand. Two inquiries, aggregating 2500 tons, are pending. Rail steel bars have sold down to 1.60c., mill, although 1.65c. is still the common quotation.

Warehouse Business.—Sales have increased slightly, and October business will show a gain over September. With reduced mill operations, mill deliveries on small-

lot orders are not so prompt as recently, and this is evidently diverting some orders to warehouses. One jobber has reduced galvanized sheets \$2 a ton. Other prices are unchanged and are being well maintained.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is slow but shows a slight gain over September. Rivet specifications are also light. Prices are well maintained at regular quotations. The bolt and nut and rivet industries are operating at about 60 per cent of capacity.

Coke.—There is little new business, and shipping orders are very slow. Prices are unchanged at \$4 to \$4.15, ovens, for standard Connellsville foundry coke and at \$2.90 to \$3.25 for heating coke. Following a spurt in buying early in the month, the demand for by-product coke for domestic use has almost disappeared. Producers continue to ask \$5, ovens, for this grade in the egg size.

Old Material.—The market is virtually at a standstill and has a weak tone. Trading by the dealers has practically disappeared, as they have very few unfilled orders against which they can make shipments. Some effort is being made to force material on the market, but without much success. A local mill which recently held up shipments on steel-making scrap has extended its embargo to blast furnace material. With this suspension and the holding up of shipments by two other Ohio mills, very little scrap is moving to consumers. Prices are unchanged but untested.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$13.50 to \$13.75
No. 2 heavy melting steel.....	13.00 to 13.25
Compressed sheet steel.....	12.50 to 12.75
Light bundled sheet stampings...	11.00 to 11.50
Drop forge flashings	12.00 to 12.50
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.50 to 11.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops...	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.....	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Philadelphia

Foundry Pig Iron Lower—Some Shading of Shape Prices

PHILADELPHIA, Oct. 18.—Business in steel shows no substantial increase, but the small orders in all markets continue to provide a fair total tonnage. On the

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, $\frac{1}{4}$ -in. and heavier.....	2.60c. to 2.80c.
Plates, $\frac{3}{8}$ -in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.80c.
Soft steel bars, small shapes and iron bars (except bands).....	2.50c. to 2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, $1\frac{1}{2}$ x $1\frac{1}{2}$ in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to $\frac{3}{8}$ -in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.35c.
Galvanized sheets (No. 24).....	5.10c. to 5.20c.
Blue annealed sheets (No. 10)...	3.00c. to 3.30c.
Diamond pattern floor plates—	
$\frac{1}{4}$ -in.	5.30c.
$\frac{3}{8}$ -in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

basis of foundry pig iron sales in the past week to eastern Pennsylvania consumers, the pig iron market has reached a slightly lower price level. The old material market shows a continued undertone of weakness. Prices on bars and plates are apparently being maintained on a basis of 1.75c. per lb., Pittsburgh, with no reports of any willingness to shade, but shapes, although fairly firm on new business, are being shaded occasionally by producers in meeting the prices at which other mills have given protection to consumers. Prices on sheets still show some softness, particularly quotations on blue annealed, which are encountering the competition of hot-rolled stripsheets.

Pig Iron.—The greater part of current transactions is in carload lots, on which \$19.50 per ton, base, represents the market. At least one sale of foundry in the past week, however, has brought out a concession from this price, so that the current market is quotable at from \$19 to \$19.50 per ton. Demand for low phosphorus iron continues fairly active, with most purchases small, but with one in the past week totaling close to 5000 tons.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$19.76 to \$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.26 to 20.76
East. Pa. No. 1X.	20.76 to 21.26
Basic (delivered eastern Pa.)	20.00
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.29 to 25.54
Virginia No. 2X, 2.25 to 2.75 sil.	25.79 to 26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—Prices are unchanged at \$33 to \$34 per ton, Pittsburgh, for rerolling billets and at \$38 to \$39 per ton, Pittsburgh, for forging grade. Orders are small and not particularly numerous.

Bars.—Business is limited to small lots, and with no decisive test of the market by a sizable tonnage, 1.75c. per lb., Pittsburgh, is apparently fairly firm. Reinforced concrete projects are small and seldom involve much of a tonnage of bars.

Shapes.—Despite recent efforts to maintain the market at 1.75c. per lb., Pittsburgh, there is some tendency to shade. This situation has developed in part from the fact that consumers are, as a rule, protected at lower prices on specific projects. In seeking additional business some producers have shown willingness to meet the protection already extended by other mills. Bridge and building construction in prospect promises some activity in the next few months. Among such projects are the Tacony-Palmyra bridge, the Pennsylvania Railroad bridge over Newark Bay and a building at Sixteenth and Walnut Streets, Philadelphia.

Plates.—Demand is small, but prices are being maintained at 1.75c. per lb., Pittsburgh, with practically no deviation. On occasional small-lot purchases 1.80c. per lb., base, is quoted.

Sheets.—Black and galvanized sheets are moderately active at 3.75c. to 3.85c. per lb., base Pittsburgh, for galvanized and 2.90c. to 3c. per lb., base, for black. The tendency of quotations is apparently toward the lower level. Blue annealed sheets range from 2.15c. to 2.25c. per lb., base Pittsburgh, and 2.10c. per lb., base, is occasionally reported when a blue annealed sheet producer meets the competition of hot-rolled stripsheets.

Ferromanganese.—Buying is small and the market is still quoted at \$90 per ton, f.o.b. furnace or seaboard, although it is currently reported that a Kentucky steel company has closed a tonnage of ferromanganese at \$88 per ton.

Warehouse Business.—Purchasing is confined to small lots of material. Plates, shapes and bars continue unchanged at the present range of quotations, but sheets have developed some weakness. Black sheet prices are fairly firm, with only occasional concessions, but both galvanized and blue annealed have been shaded. Concessions on galvanized have been as much as 20c. per 100 lb., and blue annealed has been shaded on the more sizable orders up to 30c. per 100 lb.

Imports.—In the week ended Oct. 15, a total of 2003 tons of pig iron was received at this port, of which 1503 tons came from India and 500 tons from France. Other importations were 159 tons of steel bars and 91 tons of structural shapes from Belgium.

Old Material.—Prices on all grades are substantially unchanged, but the prices at which consumers express willingness to make further purchases are lower by about 50c. per ton. No. 1 heavy melting steel continues at \$14 per ton, delivered. An eastern Pennsylvania consumer of turnings, bundled sheets and No. 2 heavy melting steel is offering to buy at 50c. per ton less than was paid on recent purchases of these materials, or at \$10.50 per ton for the turnings, \$10 for the bundled sheets and \$11 for the No. 2 heavy melting steel. Thus far brokers have been unwilling to make commitments at these prices.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$14.00
Scrap T rails	\$13.00 to 13.50
No. 2 heavy melting steel	11.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	13.00
Stove plate (for steel works)	13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.25 to 16.75
Roller steel wheels	16.00
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Steel rails for rolling	16.00
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Buffalo Mill Ships 5000 Tons of Steel to Duluth by Boat

Another forward step in the water transportation of steel from Lake Erie mills to the Middle West was the shipment of 5000 tons of material from Buffalo to Duluth, Minn., by Great Lakes vessel early in October. The steel was shipped by the Bethlehem Steel Corporation to the Great Northern Railway for use in the construction of new rolling stock in its shops at Superior, Wis. The material was unloaded from the vessel to cars for rail transfer from Duluth to Superior, 200 cars being required.

With the arrival of the steel, the Great Northern shops at Superior are undertaking one of the heaviest winter programs on record. It includes the construction of 2500 steel-underframe grain box cars, 200 50-ft. flat cars, 25 caboose frames and four steel-frame cars to be mounted with boilers for heating the Great Northern tunnel on the Cascade Division in the Rocky Mountains. A year ago the shops constructed 2000 grain box cars, setting a record now to be exceeded by 500 cars of this type. Fifty additional workmen are being added to the Superior shop force to handle the winter program.

Tioga Steel & Iron Co. Discontinues Philadelphia Operations

The Tioga Steel & Iron Co. has announced the suspension of operations at its Philadelphia plant and the transfer of manufacturing activities formerly conducted there to the plant of William Wharton, Jr., & Co., Inc., at Easton, Pa., an affiliated organization. Removal will take place without suspension of business and it is intended that the consolidation will be completed by Oct. 31. The move is being made for the sake of economies in operation and improvement of service.

The American Manganese Steel Co., Chicago, has purchased the foundry of the American Brake Shoe & Foundry Co. at Burnside, Ill. Operation under the new ownership is expected to begin about Jan. 1.

San Francisco

Award of 1400 Tons of Plates for Pipe Line—Structural Mart Active

SAN FRANCISCO, Oct. 15 (By Air Mail).—Trade during the first two weeks of the fourth quarter has shown unmistakable signs of improvement, and consumers and mill men alike are encouraged by the revival of interest being displayed in some of the major iron and steel products. Of more than passing interest this week was the award of a 1400-ton pipe line at Los Angeles and the booking of three large structural steel projects in the southern part of the State involving 3500 tons of material. Bids were received today on a 7000-ton pipe line for the Spring Valley Water Co., San Francisco, and several fair-sized tonnages of cast iron pipe are pending. The general price structure is now considered to be on a fairly firm basis.

Pig Iron.—Movement of pig iron this week was confined to small lots, and no new inquiries of moment came up for figures. Reports from the southern part of the State indicate that jobbing foundries identified with the oil country trade are still operating on a limited basis, with barely enough orders coming to hand to keep them going from day to day. Imports of foreign iron during the month of July were as follows: Seattle, Wash., 40 tons; Portland, Ore., 54 tons; San Francisco, 305 tons; and Los Angeles, 651 tons, most of the material consisting of Indian foundry iron. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	.....	25.00
**German foundry, sil. 2.75 to 3.25	.....	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Structural Shapes.—The structural shape market leads the other markets in the volume of tonnage booked, awards being in excess of 4000 tons. The Virginia Bridge & Iron Co. took 1200 tons for an office building at Pasadena, Cal., and 1100 tons for the Hotel Miramar at Santa Monica, Cal. The Foreman & Clark Building, Los Angeles, 1200 tons, was placed with McClintic-Marshall Co. The Central Iron Works secured 200 tons for an apartment in San Francisco. Fabricators report a better volume of business in tonnages ranging from 40 to 60 and 70 tons. Imports of plain foreign material during July were distributed in Coast ports as follows: Los Angeles, 260 tons; San Francisco, 1420 tons; Portland, Ore., 217 tons, and Seattle, Wash., 285 tons. Prices on plain domestic material remain unchanged at 2.40c., c.i.f. Coast ports.

Plates.—The largest award of the week called for 1400 tons for a pipe line for the city of Los Angeles, 1100 tons of which was for pipe ranging from 54 to 84 in., hammer welded, booked by the United States Steel Products Co., and 375 tons of 84-in. riveted pipe, placed with the Lacy Mfg. Co. Bids have been opened on 5000 ft. of 20-in. shore pipe for the United States Engineer's Office, San Francisco, involving 300 tons. Fabricators and mills are awaiting with interest the result of the opening of bids at San Francisco to-day on the 54-in., 7000-ton pipe line for the Spring Valley Water Co. So far as can be ascertained the three leading producers of plates are holding to 2.40c., base, c.i.f. Coast ports, although in all probability 2.40c., c.i.f., flat, with no extra for flange quality, will develop on the above 7000 tons.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, $\frac{3}{8}$ -in. and over	3.15c.
Small angles, under $\frac{3}{8}$ -in.	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{1}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Structural rivets, $\frac{1}{2}$ -in. and larger	5.65c.
Common wire nails, base per keg	\$3.35
Cement coated nails, 100-lb. keg	3.35

Bars.—During the month of July imports of foreign bars, both merchant and concrete, were as follows: Los Angeles, 670 tons; San Francisco, 980 tons; Portland, 355 tons, and Seattle, 190 tons. Among the larger lots of concrete bars placed this week were 300 tons for a tunnel at Vancouver, B. C., and 260 tons each for an apartment in Los Angeles and for State highway paving work near Pismo, Cal. The Steel Service Co. has taken 110 tons for the two Estuary Tube Portal Buildings at Oakland, Cal. Bids are being received for 600 tons for the Big Dalton Creek dam, Los Angeles, and bids have been opened on 250 tons for the city of Los Angeles, on which the California Hardware Co. was low bidder. Prices in the San Francisco district are fairly firm to the levels quoted last week.

Track Supplies.—The Southern Pacific Co., San Francisco, has awarded 6000 kegs of track spikes and 100 kegs of track bolts to a Western mill. No action has yet been taken by this company on its inquiry for 50 tons of rivets.

Cast Iron Pipe.—Only two awards calling for more than 100 tons were placed this week. The largest booking, 753 tons of 4, 6, 18 and 20-in. Class B pipe, was awarded as follows: 669 tons of 4, 18 and 20-in. to B. Nicoll & Co. and the remainder, 84 tons of 6-in. Class B, to the American Cast Iron Pipe Co. An unnamed interest secured 155 tons of 3 to 48-in. Class B pipe for the improvement of Saddle Peak Road, Los Angeles. Pending business of importance is as follows:

GLADSTONE, ORE., 730 tons, 4 to 12-in. Classes A and B or Classes 50 and 150, United States Cast Iron Pipe & Foundry Co., low bidder.

BURLINGTON, ORE., 385 tons, 2 to 6-in. Class B. Bids opened.

SAN DIEGO, CAL., 310 tons, 6 to 10-in. Class B for improvement of Valencia Park. Bids, Oct. 17.

Low prices continue to prevail on the Coast, and less than \$36 a ton, delivered, has recently been quoted on 6-in. and larger.

Warehouse Business.—No change in out-of-stock prices is noted. Distributors report sales so far this month in excess of the total for the same period last month.

Birmingham

Demand for Finished Steel Improves—Heavy Melting Scrap Declines

BIRMINGHAM, Oct. 18.—Pig iron tonnage booked last week was not up to that of the two preceding weeks. Many melters bought at the beginning of the month for the first two weeks and have not yet placed orders for the last half. The present week is expected to bring out a fair volume of business. Buying continues to be mostly for October shipment, even though the month is well toward the end. Only a few sales call for deliveries extending into November. Prices still hold to a \$17.25 base, furnace. Shipments of merchant producers are running along at about the same rate as last month and are in close conformity with output. If this continues, very little iron will be piled in October. Nineteen furnaces are in operation, the same number as for some time past. The Tennessee Coal, Iron & Railroad Co. changed one of its Ensley furnaces, which had been on foundry since June, back to basic. For the first time this year the Tennessee company is not producing foundry iron. The Woodward Iron Co. has changed one of its stacks, which had been on basic since July, back to foundry for a short time. Of the 19 active furnaces, six are on basic, 11 on foundry, one on ferromanganese and one on recarburizing iron. Manganese ore from the Far East is being received by the Tennessee Coal, Iron & Railroad Co. As reported several weeks ago, the total shipment will amount to around 20,000 tons.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	\$17.25
No. 1 foundry, 2.25 to 2.75 sil.	17.75
Basic	17.25

Finished Material.—Improvement in nearly all lines is reported, and the outlook is better than for some time past. Prices are unchanged. Rail bookings are not quite so large as at this time last year. Miscellaneous

Business from railroads is in about the same volume. Several structural steel plants are operating at almost full time, with prospects for considerable additional tonnage. Bar manufacturers report a fair amount of business in hand. Open-hearth furnace operations are the same as for the preceding week. The Tennessee Coal, Iron & Railroad Co. is operating eight furnaces and frequently all nine at the Ensley works and four of eight at the Fairfield works. The Gulf States Steel Co. has five out of six in operation.

Cast Iron Pipe.—Outside of some small business and the award of the Galveston tonnage, the market showed very little activity last week. The Galveston award, amounting to around 1000 tons, went to the United States Cast Iron Pipe & Foundry Co., which will furnish the pipe from its Birmingham plant. No special improvement in demand has been noticed and prices remain unsettled, being nominally on a base of \$30 but not maintained. The Bessemer, Ala., plant of the Central Foundry Co. was called on to furnish emergency pipe for the Bessemer waterworks system. The city's source of supply failed and connections had to be made immediately with the Birmingham system. The Central Foundry Co. furnished for these connections 2000 ft. of 8-in. Universal pipe, 12,000 ft. of 12-in. and 5000 ft. of 14-in.

Coke.—There was very little buying during the past week, either of spot or contract coke. Shipments on contracts were about at the same level as in the last several weeks. Producers and sales agents continue to quote foundry coke at \$5.50 per net ton, Birmingham, on contract and \$6 for spot material. The first coke was pulled Oct. 12 from the new by-product unit of the Alabama By-Products Corporation, which consists of 49 Koppers ovens of the Becker type. The plant of the Alabama By-Products Corporation now has 149 ovens. Two other by-products plant developments are under way. The Tennessee Coal, Iron & Railroad Co. is building a new unit of 63 Koppers ovens, each of 18 tons capacity. This unit will not be completed until the early part of next year. The Sloss-Sheffield Steel & Iron Co. is enlarging and remodeling its 120 ovens.

Old Material.—Business is quiet, and prices are weaker. Sales in all lines last week were small. There are not many inquiries, and only a few buyers are in the market. Heavy melting steel has declined to \$10 a ton. Borings and turnings have dropped 50c. a ton.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel.....	\$10.00
Scrap steel rails.....	\$11.00 to 12.00
Short shoveling turnings.....	8.00 to 8.50
Cast iron borings.....	8.00 to 8.50
Stove plate.....	13.00 to 14.00
Steel axles.....	19.00 to 20.00
Iron axles.....	18.00 to 20.00
No. 1 railroad wrought.....	10.00 to 11.00
Rails for rolling.....	12.00 to 13.00
No. 1 cast.....	15.00 to 16.00
Tramcar wheels.....	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chemical.....	13.50 to 14.00

St. Louis

Award of Large Concrete Bar Tonnage Blocked by Suit—Pig Iron Quiet

ST. LOUIS, Oct. 18.—With purchases of pig iron confined to miscellaneous tonnages and small lots, the

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock.....	3.75c.
Black sheets (No. 24).....	4.80c.
Galvanized sheets (No. 24).....	5.35c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets.....	4.65c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets.....	3.60c.
Boiler rivets.....	3.80c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller.....	70
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-pressed nuts, square, blank or tapped.....	60
Hot-pressed nuts, hexagon, blank or tapped.....	60

Granite City maker's sales totaled only 2300 tons for the week. Sales ranged from a carload up to 500 tons, including a few scattered orders for malleable iron. Stocks in the hands of melters are said to be extremely low, and a reasonable increase in melt would force almost all of them to enter the market immediately for supplies. Prices are unchanged. Delay in the release of the new Ford model and lack of railroad purchases are given as causes for the falling off in business.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b.	
Granite City, Ill.....	\$19.50 to \$20.00
Northern No. 2 fdy., delivered	
St. Louis.....	20.66
Southern No. 2 fdy., delivered.....	21.67
Northern malleable, delivered.....	20.66
Northern basic, delivered.....	20.66

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—A leading Chicago mill made a reduction during the week of \$2 a ton on black and galvanized sheets and \$1 on blue annealed. These prices have been met by the Granite City mill. The Missouri-Kansas-Texas Railroad, whose inquiry for 12,500 tons of rails is still pending, has also asked for prices on 5000 kegs of track spikes and 1000 kegs of track bolts. The placing of the order for 7700 tons of reinforcing bars required in the River Des Peres sewer project has been held up pending settlement of court action brought by the lowest bidder on the general contract, whose tender was rejected in favor of the second lowest. Warehouse business is poor.

Coke.—Buying of coke is light. The weather continues mild, and another factor adversely affecting the sale of domestic sizes is the settlement of the coal strike in southern Illinois. Weakness in coal is being reflected in some degree by coke.

Old Material.—The market continues extremely dull. Mills in this district will not buy material except at prices which dealers say are unprofitable, and dealers, in turn, will not buy until they have orders from their customers. Stocks in hands of mills are ample, but dealers' stocks are very light. Railroad lists continue heavy, this week's offerings totaling 18,800 tons. Dealers are bidding on them as a matter of form and in the hope that someone else will be awarded the material. The only price change of the week is a reduction of 50c. in railroad malleable. Railroad lists include: Rock Island, 7000 tons; Chesapeake & Ohio, 5100 tons; Texas & Pacific, 880 tons; Missouri Pacific and Chicago & Alton, 800 tons each; Pullman Co. (St. Louis), 450 tons, and Mobile & Ohio, 350 tons of relaying rails.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel.....	\$11.25 to \$11.75
No. 1 locomotive tires.....	13.50 to 14.00
Heavy shoveling steel.....	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	13.75 to 14.25
Railroad springs.....	14.00 to 14.50
Bundled sheets.....	8.25 to 8.75
No. 2 railroad wrought.....	11.25 to 11.75
No. 1 busheling.....	10.00 to 10.50
Cast iron borings.....	9.00 to 9.50
Iron rails.....	12.50 to 13.00
Rails for rolling.....	14.50 to 15.00
Machine shop turnings.....	6.50 to 7.00
Steel car axles.....	19.00 to 19.50
Iron car axles.....	23.50 to 24.00
Wrought iron bars and transoms.....	19.50 to 20.00
No. 1 railroad wrought.....	11.00 to 11.50
Steel rails, less than 3 ft.....	15.00 to 15.50
Steel angle bars.....	12.25 to 12.75
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable.....	11.75 to 12.25
No. 1 railroad cast.....	13.00 to 13.50
Agricultural malleable.....	12.00 to 12.50
Relaying rails, 60 lb. and under.....	20.50 to 23.50
Relaying rails, 70 lb. and over.....	26.50 to 29.00

William H. Leonori & Co., 30 Howard Street, New York, have been appointed district sales representatives in eastern and northeastern New York State, metropolitan New York and New Jersey east of Trenton for the Fitzsimons Co., Youngstown, manufacturer of carbon and alloy cold finished steel bars.

Boston

Pig Iron Prices Holding in Quiet Market —Gain in Melt Very Slow

BOSTON, Oct. 18.—Prices for those brands of pig iron that are usually most active in New England are holding, despite a lack of any great amount of business. The Mystic Iron Works, with sales of 2500 tons, was the leader in business booked in the past week. Where the freight rate to consuming points is high, the company's minimum price on No. 2X iron is \$19 a ton, on cars, furnace. Recent sales have been made to foundries having a low freight rate at as high as \$21.50 a ton. Delivered prices for Mystic iron are in line with those from New York State furnaces. Some iron from Buffalo, western Pennsylvania and Alabama is being bought for mixture purposes, but tonnages involved are small and prices are above those quoted by furnaces east of Buffalo. The Springfield Foundry Co., Springfield, Mass., will close against an inquiry for 300 tons of No. 1X this week. The anticipated inquiry from a Massachusetts melter for 400 tons of No. 2X and 100 tons No. 1X has not materialized. Furnaces report shipping instructions running high one week and low the next, with the average per month showing little, if any, increase.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	\$21.41 to \$21.91
Buffalo, sil. 2.25 to 2.75	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Virginia, sil. 1.75 to 2.25	25.96 to 26.21
Virginia, sil. 2.25 to 2.75	26.46 to 26.71
Alabama, sil. 1.75 to 2.25	24.16 to 26.02
Alabama, sil. 2.25 to 2.75	24.66 to 26.52

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. report specifications against last half contracts for by-product foundry coke as only fair. As compared with a year ago, shipments are disappointing, clearly indicating that the recovery in melt since the summer dull period has been very slow. In addition, comparatively few foundries are stocking fuel in anticipation of winter requirements, whereas a year ago a considerable number were doing so. Both companies are still doing business on a basis of \$12 a ton, delivered, within a \$3.10 freight rate zone, and at the moment there is no indication of a change in price on Nov. 1. New England continues to import round tonnages of European fuel. During the past week a sizable tonnage of Welsh anthracite arrived at Providence, R. I., for the New England Coal & Coke Co.

Cast Iron Pipe.—No municipality was openly in the market for pipe in the past week. It is reported some are negotiating privately for pipe to be delivered later in the year, but details are lacking. One of the largest Massachusetts gas companies is feeling out the market for its spring pipe requirements, on which deliveries are to be made in the closing days of 1927. The market for small pipe appears firmer, but on large it is still unsettled.

Shapes and Plates.—Little new business came up in

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Plats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

the past week for fabricators to figure on. Most of the important shops, however, are fairly well filled with work, particularly with small jobs on which there is a good profit. The demand for shapes and plates is fair, but not up to last year's level at this time. Prices remain firm. Large tonnages of standard shapes are bringing 1.70c. to 1.75c. per lb., base Pittsburgh, and small lots, 1.80c. to 1.85c. Plates are generally quoted at 1.75c., with occasional bookings at 1.80c.

Old Material.—Little scrap is moving in New England or to points outside; dealers are still anxious to sell material, while prices remain soft. There is, perhaps, a slightly lower range of going prices on steel turnings, steel mill borings and bundled skeleton, but owing to the lack of actual sales it is difficult to determine a real basis of values. Brokers here believe that prices on various materials will be lower before the close of the current week. For instance, small tonnages of stove plate are moving today at \$8.10, on cars shipping point, for delivery outside New England, but within a few days the price is expected to drop to \$7.60. A reduction of 50c. a ton on No. 1 heavy melting steel is in the making, it is said. New England foundries show more interest in No. 1 machinery and textile cast at around \$15 a ton, delivered, but demand is by no means active.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$8.50 to \$9.00
Scrap rails	8.50 to 8.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	5.75 to 6.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	6.00 to 6.25
Forged flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.00
Forge scrap	5.75 to 6.00
Shafting	13.00 to 13.50
Street car axles	17.00 to 17.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.50 to 11.00
Cast iron borings, chemical	10.25 to 10.75

Prices per gross ton delivered consumers' yards:

Textile cast	\$15.00 to \$15.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.00 to 14.50

Youngstown

Pipe Discounts Unsettled, Strip Prices Uncertain—Scrap Weak

YOUNGSTOWN, Oct. 18.—Steel manufacturers in this district are still unable to detect any material betterment in business, and plant operations are declining rather than increasing. Steel ingot production in the Mahoning and Shenango valleys does not average more than 50 per cent of capacity, and, as has been true for several weeks, there are some companies that are not doing that well. If there is any truth in the report that the Ford Motor Co. will soon introduce its much talked of new model, it will be helpful to local companies, who produce several kinds of steel that the Ford company is not yet equipped to produce in its own River Rouge steel works. The company still has to buy sheets, strips and cold-finished steel bars, but on most other forms of steel used in the production of automobiles the company is self-contained, and regardless of when the new car comes out, it will not result in heavier sales by local makers of hot-rolled bars, to mention one important product of this district.

Some makers have noted a slightly better movement of sheets in the past week, but much care is taken in making the comment to qualify it by saying that the gain has not produced any strain upon productive capacity or any quickening in mill operations. Makers here are generally quoting the lower prices recently announced, or 2.90c., base Pittsburgh, for black, 3.75c., base, for galvanized, and from 2.10c. to 2.20c., base, according to the gage and width, for blue annealed. On automobile body sheets 4.15c., base Pittsburgh, is recognized. Leading sheet producers are plainly dissatisfied with these prices, and some, in view of the fact that the cut has not stimulated business, are still wondering why it was made.

Pipe business is still fairly steady in butt welded goods, such as go into building and construction work, but activity is lacking in both welded and seamless pipe for oil well development, and there is as yet no sign of the large pipe line orders for gas lines in the West and Southwest, which have been talked about for some time. Much confusion exists as to pipe prices, more particularly with regard to the supplementary and preferential discounts. For some time extra discounts have been given to buyers or jobbers who ordinarily account for considerable pipe tonnage. The resultant prices appear to have lately affected the sales of the country's largest producer, and that interest has been permitting its jobbers to meet competition. Price concessions have been more common in oil country goods and in line pipe than in butt welded pipe, and the lowering of prices through increased preferential and supplementary discounts was supposed to have been confined to those classes of goods. However, there has lately developed a demand for similar price treatment on butt welded pipe.

Youngstown mills have not been able to do much business in steel bars at more than 1.75c., base Pittsburgh, and the few sales that have been made at more have covered lots of a size and character that few mills would take except at some premium over the regular market price. There is no great activity in strip steel, since the automotive industry is still running light and ordinarily consumes fully 60 per cent of the output. Much uncertainty exists in hot-rolled strip prices, pending the outcome of a recent effort to classify prices on the basis of the annual takings of buyers. On cold-rolled strips the attempt to establish the base price on lots of one up to three tons, with a deduction for larger lots, has not been particularly successful. It seems probable that there will be a return to the former practice of a base price founded on sizable lots, with an extra for smaller quantities.

The scrap market is dull and weak, and mills are able to buy heavy melting grade at \$15.

Buffalo

Reinforcing Bar Market Active—Pig Iron and Scrap Show Little Life

BUFFALO, Oct. 18.—The pig iron market is very quiet, but furnaces believe that there is still considerable iron to be bought during the quarter. Quotations are unchanged at \$17, furnace, for No. 2 plain and \$17.50 for malleable, although there has been no inquiry in the past week to test these prices. Shipments are reported as not quite so good as recently, as a result of inventory-taking by several foundries. Inquiry consists exclusively of small tonnages, principally lots of 50 and 100 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X foundry, sil. 2.25 to 2.75.....	17.50
No. 1X foundry, sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic.....	17.00
Lake Superior charcoal.....	27.28

Finished Steel.—The demand for bars and shapes is light, with prices fairly firm at 2.015c., Buffalo. The sheet market is softer, with 2.90c., base Pittsburgh, being done in some instances on black and 3.75c. on galvanized. Discounts on bolts and nuts are firm, with practically no shading. Specifications are as good as were expected. Farm equipment manufacturers are optimistic, and considerable business in bolts and nuts is expected from them. Demand for bolts and nuts

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

from the automobile industry is not good, but is expected to pick up after the first of the year. Railroad buying of these products has been comparatively light. Reinforcing bar demand is active, with several new jobs out since a week ago. The Huron Cement Co., Buffalo, has let the general contract for a storage warehouse which calls for 500 tons; an equal tonnage will be required in a steam plant to be erected in Buffalo by the General Electric Co. Two schools call for a total of 230 tons. Buffalo district mill operations range from 55 to 60 per cent of capacity.

Old Material.—Buying is limited. Most old orders have been filled, and dealers believe that the mills, whose stocks are now low, will soon come into the market. Dealers are doing practically nothing; two yards are down entirely and others are operating at about 50 per cent of capacity. There have been a few sales of cast iron borings and machine shop turnings. Turnings have declined to a range of \$9.25 to \$9.50. Only a small part of the material advertised in recent railroad lists came to Buffalo, most of the tonnage having gone to Pittsburgh and Youngstown. Some of the dealers who still have local orders to fill are paying more than \$15 for heavy melting steel which they sold some months ago at \$15.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.75 to \$15.00
No. 2 heavy melting steel.....	14.00 to 14.25
Scrap rails.....	14.50 to 15.00
Hydraulic compressed sheets.....	12.25 to 12.50
Hand bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	11.50 to 12.00
No. 1 busheling.....	13.00 to 13.25
Heavy steel axle turnings.....	12.75 to 13.25
Machine shop turnings.....	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers.....	15.75 to 16.25
Railroad coil and leaf springs.....	17.00 to 17.50
Roller steel wheels.....	15.75 to 16.25
Low phosphorus billet and bloom ends.....	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings.....	12.75 to 13.25
Short shoveling steel turnings.....	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings.....	10.75 to 11.00
Short mixed borings and turnings.....	9.75 to 10.00
Cast iron borings.....	10.00 to 10.50
No. 2 busheling.....	9.00 to 9.50
Rolling Mill Grades	
Steel car axles.....	15.00 to 16.00
No. 1 railroad wrought.....	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast.....	14.75 to 15.25
Stove plate.....	13.25 to 13.75
Locomotive grate bars.....	11.00 to 11.50
Steel rails, 3 ft. and under.....	16.50 to 17.00
Cast iron carwheels.....	14.00 to 14.50
Malleable Grades	
Railroad.....	15.00 to 15.50
Agricultural.....	15.00 to 15.50
Industrial.....	15.00 to 15.50

Cincinnati

Lake Pig Iron Sellers Aggressive—Coke Shipments Suspended

CINCINNATI, Oct. 18.—The pig iron market remains dull. No sale of more than 100 tons has been reported, and almost without exception inquiries are only for

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
Reinforcing bars.....	3.30c.
Hoops.....	4.00c. to 4.25c.
Bands.....	3.95c.
Cold-finished rounds and hexagons.....	3.85c.
Squares.....	4.35c.
Open-hearth spring steel.....	4.75c. to 5.00c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10).....	3.60c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 annealed wire, per 100 lb.....	\$3.00
Common wire nails, base per keg.....	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$18.00
4-in.....	28.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.....	29.00

single carloads. Some foundries are still taking out tonnages on third quarter contracts, while others are specifying at a fair rate on contracts closed during August and September. With an almost total absence of consumer demand, it is not surprising that the price situation is weak. Northern Ohio furnaces are understood to be booking some business on a basis of \$16.50 to \$17, Cleveland. Meanwhile, as producers in the southern Ohio district are firm at \$19, base Ironton, they are not able to obtain many orders at that figure, although they are selling small lots to melters located within a short distance of the furnaces. Curtailed operations in the automotive industry are responsible for a decreased movement of Jackson County silvery iron, and prices have been reduced \$1.50 a ton to \$27, furnace, for 8 per cent. Southern iron quotations are unchanged at \$17.25, base Birmingham.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	20.94
Alabama fdy., sil. 2.25 to 2.75....	21.44
Tennessee fdy., sil. 1.75 to 2.25..	20.94
Southern Ohio silvery, 8 per cent	28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—No signs of expansion in the demand for steel by consuming industries have appeared, sales and inquiries being confined to small lots for prompt delivery. General industrial operations in this territory remain at about 80 per cent of normal for this time of the year, and the curtailment of activity has prevented an acceleration of business in finished steel products. Another important factor holding orders down to the present low level is the weakness of the price structure. Buyers are trying persistently to purchase single carloads of bars, plates and shapes at 1.75c., per lb., base Pittsburgh, and in some cases have been successful. In the structural field, operations are less active than a few weeks ago. Fabricating shops are in need of work to maintain production on the present basis, and new jobs are coming out slowly. The McClintic-Marshall Co. will furnish 750 tons of steel for the new building of the American Druggists Fire Insurance Association in this city. In the sheet market mills in this district have reduced their quotations \$2 a ton to 2.15c., base Pittsburgh, blue annealed, 2.90c. for black, 3.75c. for galvanized, and 4.15c. for automobile body sheets. However, insufficient business has come out in the past week to test these prices. Mills are operating at about 75 per cent of capacity. Wire goods are moving in slightly greater volume, with common wire nails still selling at a delivered price of \$2.69 a keg.

Warehouse Business.—There has been a slight improvement in sales during the past week, but total bookings are disappointing. Indications are that the volume of business in October will closely approximate that of September.

Coke.—Fresh orders booked by local dealers have been meager, and competition among producers is keen. By-product domestic nut coke from northeastern Ohio is being shipped into this market at a delivered price below that of companies in this territory. In by-product foundry coke specifications are light, and several large consumers in the automobile trade are asking for temporary suspension of shipments on contract. Prices of beehive foundry coke from the Wise County and New River districts have not changed, but sales have been unimportant.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$5.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforcing bars	2.90c.
Black sheets (No. 24)	4.85c.
Galvanized sheets (No. 24)	5.40c.
Blue annealed sheets (No. 10)	3.85c.
Rivets, button and cone head.....	5.00c.
Rivets, tank .....	.50 per cent off list
Common wire nails, base per keg	\$3.25
Cement coated nails, 100-lb. keg	3.25

Old Material.—The scrap market has been listless, neither consumers nor dealers having been active. Although prices have not been altered in the past week, there have been no sizable transactions to give them a real test. Railroads are reported to have got slightly less for their material last week than in September.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	\$11.75 to \$12.25
Scrap rails for melting	12.75 to 13.25
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	16.50 to 17.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	8.00 to 8.50
Stove plate	9.50 to 10.00
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable.....	12.00 to 12.50

Toronto

Rail Orders and Structural Steel Business Enliven Canadian Market

TORONTO, ONT., Oct. 18.—While advance sales of pig iron have declined in the Canadian market, business as a whole continues at a good level. Some contracts are being placed for the quarter, but no large tonnages are involved and those who have not covered for this period now appear in no hurry, some of them being satisfied to buy on a spot basis. Spot sales are calling for larger tonnages than recently, and repeat orders are appearing at more frequent intervals. Shipments against contracts are going forward on schedule. Water shipments of iron to consumers in Ontario and Quebec are speeding up, and many consumers who are anxious to take advantage of water rates are now accepting delivery of their winter's supply of iron. Imports from European countries are also increasing as the season of navigation on the St. Lawrence River draws to a close. European iron, however, has little effect on the Canadian markets, although United States interests are responsible for rather keen competition for some orders, especially in the Montreal district, where price shading has been more frequent of late. It is expected that pig iron production will be increased as a result of large rail orders recently placed with Canadian mills. Ruling Canadian pig iron prices are unchanged.

Prices per gross ton:

	Delivered Toronto
No. 1 foundry, sil. 2.25 to 2.75.....	\$23.60
No. 2 foundry, sil. 1.75 to 2.25.....	23.60
Malleable	23.60
	Delivered Montreal
No. 1 foundry, sil. 2.25 to 2.75.....	25.50
No. 2 foundry, sil. 1.75 to 2.25.....	25.50
Malleable	25.50
Basic	24.50
	Imported Iron at Montreal Warehouse
Summerlee	33.50
Carron	33.00

Rails.—Additional rail orders have been placed by the Canadian National and Canadian Pacific railroads, and Canadian mills have received rail tonnages from several other sources of late. The Dominion Iron & Steel Corporation (British Empire Steel Corporation), Sydney, N. S., is now rolling a rail order for the Indian Government lines. The Canadian National Railways also have authorized the Dominion Iron & Steel Corporation to roll a quantity of 100-lb. rails up to 20,000 tons to be held for delivery until 1928. W. C. Franz, president Algoma Steel Corporation, Sault Ste. Marie, Ont., reports orders considerably improved. After rolling 20,000 tons of rails in August and September, the company had orders at the first of this month aggregating \$4,173,000, which included 50,000 tons of rails booked for winter rolling for Canadian roads, a large portion of which is for the Canadian National Railways. In connection with railroad equipment, the Newfoundland Railway has an appropriation of \$250,000 for rolling stock and will probably order in the imme-

diate future one or two locomotives, two sleeping cars and three self-propelled cars.

Structural Shapes.—A strong demand continues throughout Canada for structural steel, both for building and bridge construction. In Toronto alone buildings to be erected in the course of the next three months will require upward of 25,000 tons of steel, while in the Montreal district close to 15,000 tons will be required. The Dominion Bridge Co., Montreal, has received a contract for 5500 tons for the new Chateau Laurier, at Ottawa, Ont. At Toronto approximately 7000 tons of structural steel will be required for a new office building and newspaper plant for the Toronto *Daily Star*; 8000 tons, for a Canadian Pacific Railway Hotel and about 5000 tons each for a Canadian Bank of Commerce building and the Commerce and Transportation Building.

Old Material.—While one can find no actual improvement in business in this market, sales as a whole are holding well up to the level of the past few weeks. As has been the case for some time past Hamilton, Ont., consumers are responsible for the greater part of current demand, taking large shipments of heavy melting steel, turnings and various other grades. The greater part of current business is confined to spot buying. In the Montreal market business has slumped and prices show a softening tendency. Standard carwheels, for which Montreal dealers formerly offered \$16 per gross ton, are now being picked up at \$15; dealers are now offering \$16 for machinery cast, a decline of \$1 per ton during the week, while heavy axle turnings have been reduced from \$8 to \$7.50 per gross ton. While other Montreal prices are unchanged, they are weaker. Toronto prices are holding firm at the former level.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.....	\$9.50	\$9.00
Rails, scrap	10.00	10.00
No. 1 wrought	10.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings.....	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	7.00
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron.....	16.00	21.00
No. 1 machinery cast.....	16.00	16.00
Stove plate	12.50	12.50
Standard carwheels	15.00	15.00
Malleable scrap	14.00	14.00
	Per Net Ton	
No. 1 machinery cast.....	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Wrought Iron and Steel Pipe and Tubing Standardization

To develop unified, nationally recognized standard specifications for wrought iron and wrought steel pipe for industrial and domestic uses, all existing standards and specifications are to be thrown into a common pool and a representative sectional committee, containing delegates from every important interest concerned, will carry on a large program of standardization under the auspices of the American Engineering Standards Committee. The American Society for Testing Materials and the American Society of Mechanical Engineers will act as leaders in this work and will proceed promptly with the organization of the sectional committee.

The special committee on this project, headed by W. J. Serrill of the United Gas Improvement Co., Philadelphia, has recommended the following scope for the work:

Standardization of the design, dimensions and material of welded wrought iron pipe, of welded and seamless steel pipe, and of boiler tubing, including pipe and tubing for high temperatures and pressures.

With the new Ford car practically certain to be in active production in November, *Automotive Industries* suggests that the automotive industry will return to a high production basis in that month with many companies besides Ford sharing active demand. October, it adds, will register as the low production month of the year, though many companies have maintained a fair activity.

Detroit

Gain in Structural Business is Below Normal—Scrap Declines

DETROIT, Oct. 18.—Although the first half of October is showing up somewhat better than the same period last month in fabricated structural steel lines, there is not the activity which October should show. A notable shortage is apparent in the small alteration and repair jobs that usually appear about this time. As a result, the small structural shops are quiet.

Two large local steel jobs now being discussed are the Stock Realty Building, which should contain more than 3000 tons, and a car storage assembly building for the Oakland company, which will require 3000 to 4000 tons of structural steel. Bids on the latter will probably be asked for before those on the Stock Realty Building. Mill prices on structural shapes are holding at 1.75c., base Pittsburgh.

Automotive demand for finished steel is scattered, and stocks in the hands of motor car builders are being held at a minimum, as evidenced in the case of one firm which normally uses approximately 90,000 tons of steel per year, but which at present is carrying only about 1500 tons. In the face of current dullness in the industry, light truck production is being maintained, as is the output of passenger cars in the higher price range.

Demand for alloy steel bars, while not brisk, is fairly well distributed throughout the range of specifications, with 3½ per cent nickel, chrome and chrome vanadium a little more active than the rest. Mill prices are steady at the minimum bases.

Old Material.—There has been a decided weakening in the scrap market in this district, with the result that most grades have registered a decline of 50c. per ton. This is due primarily to the fact that practically no buying is being done by mills and furnaces and at the same time considerable tonnage is being offered by the producers in the district.

Dealers' buying prices per gross ton, f.o.b. cars,

Detroit:

Heavy melting and shoveling steel	\$11.75 to \$12.25
Borings and short turnings.....	8.50 to 9.00
Long turnings	7.50 to 8.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	18.00 to 19.00
Hydraulic compressed sheets....	10.50 to 11.00
Stove plate	11.50 to 12.50
No. 1 busheling.....	9.50 to 10.00
Sheet clippings	7.50 to 8.00
Flashings	9.75 to 10.25

Foote Brothers Acquire A. Plamondon Mfg. Co.

The Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago, has purchased the A. Plamondon Mfg. Co., Chicago, manufacturer of gearing and transmission equipment. The latter organization was founded in 1859 by Ambrose Plamondon and has gradually expanded until the present plant occupies a factory building 125 x 500 ft., including machine shop, pattern shop and foundry. The company specializes in large sizes and machine molded gears, produces a few worm gear reducers and its line of transmission equipment includes shafting, pulleys, collars, hangers, bearings, friction clutches, flywheels and rope sheaves. It also does a large business in heavy special machinery built to order.

The Foote Brothers organization manufactures all kinds of gearing and special machinery and speed reducers of all types, including spur, worm and herringbone types in a large variety of sizes and ratios. The Plamondon plant will be operated as in the past and the personnel of both companies will be unchanged.

United States exports of aircraft products during July were valued at \$191,094, according to the Automotive Division of the Department of Commerce. Exports consisted of one plane valued at \$11,354, 19 aircraft engines valued at \$148,767 and aircraft parts valued at \$30,973. Germany was the principal purchaser with imports valued at \$71,080.

TO BETTER MERCHANDISING

Offers Seven-Point Program to Solve Distribution Problems

The business press and the new competition were the subject of an address delivered by Charles F. Abbott, executive director American Institute of Steel Construction, Inc., New York, at the annual convention of the Associated Business Papers, Inc., at Chicago, Oct. 17. "We can all remember the time," said he, "when competition was chiefly confined to concerns in the same line of business. Today we see whole industries organized for encroachment upon each other's markets. Tomorrow we shall almost certainly begin to feel the effects of intensive competition of a still wider scope—whole nations, or groups of nations, organized against each other for the conquest of the markets of the world. These are the forces which constitute the new competition."

Some powerful concerns may feel that, standing alone, they can defy the power of inter-industry competition, continued Mr. Abbott, who quoted J. George Frederick, president Business Bourse, New York, to substantiate a statement that an appalling number of concerns are earning a net profit that falls far short of a reasonable return on the investment. The total number of corporations doing business in the United States during 1925 was 430,072. Of this number, 177,738, or 41.3 per cent, showed an aggregate loss amounting to approximately \$2,000,000,000. The 252,334 successful corporations made a profit of \$9,500,000,000.

Mr. Abbott referred also to an analysis of some fifty industries made to determine the range of profit as compared with invested capital. The profits ranged from \$3 on every \$100 invested up to \$32. Drawing a line between \$10 and \$11, further analysis revealed the information that those industries below the line neglected modern merchandising methods, while those above the line were active in applying them.

Program for Better Merchandising

Mr. Abbott outlined a program to bring merchandising up to the plane of production and finance, as follows:

1. Employ research to obtain a true conception of the market, develop new uses, and aid in the cultivation of both old markets and new
2. Use increased care in the selection, training and supervision of salesmen
3. Base the sales approach upon the service the product will render rather than upon price per unit
4. Establish equitable relationships between producers and their distributing, or intermediate, industries
5. Establish and maintain sales prices in accordance with the fundamental law of costs plus a fair profit
6. Take advantage of the tremendous possibilities offered by the intelligent use of well prepared advertising
7. Organize the industry on a cooperative basis in order that it may undertake those activities which the individual concern may not be in a position to assume.

Touching on the program, he had the following to say in part:

Research, involving a survey of the market and the adaptation of the product to meet the needs and wants of the prospective buyers, provides one of the best guarantees of success in any effort to cultivate old markets more intensively, or to develop new ones.

There are producers who maintain fabricating units and attempt to compete with those whom they recognize as their distributors. So long as this competition is maintained on an equitable price plane, no objection can be raised. But when it is utilized as a means of forcing trade or maintaining volume production, without regard to the protection that should be accorded the distributor, it is competition in a most destructive form. The distributor suffers a serious loss, while the producer cannot be unaffected by the ill-will of those upon whom he must depend for the distribution of a large part of his product.

Another practice which should be condemned is that of recognizing brokers, commission agents, or those

without equipment or facilities that properly classify them as legitimate distributors. Producers who solicit business of this character, quoting prices as low as, or lower than, those quoted the well established distributing organizations, disregard the importance of a sound selling policy.

For years the steel industry was a laggard in advertising. A number of its cooperative associations were among the first to enter the field. More recently, a considerable number of individual organizations have followed their example, the Illinois Steel Co., among others. No better example of effective advertising could be found than the campaign now being conducted by this company. It is giving the whole steel industry new evidence of the possibilities of advertising when intelligently formulated and directed. It is demonstrating anew the need of advertising as a means of developing a public appreciation of steel, and of its contribution to the progress of civilization.

Another illustration of effective advertising is given by the Virginia Bridge & Iron Co., of Roanoke, Va., one of the larger independent plants, whose advertising campaign has attracted favorable comment. Intelligently conceived and prepared, the advertising features the merits and advantages of steel for construction purposes, and the service behind each contract.

The research and analytical departments which many of the business publications maintain should be placed at the disposal of their subscribers. The service should be utilized in educating the members of the industry to the value of an exact knowledge of the situation as regards the market and other vital factors.

Export Freight Rates on Iron and Steel to Be Cut

Railroads in the Eastern Trunk Line Association are preparing to announce a reduction in freight rates from the Pittsburgh district to the northern Atlantic ports on iron and steel articles for export. The matter was the subject of a conference held at the Pittsburgh Chamber of Commerce, Friday, Oct. 14. R. M. Collyer, New York, chairman Eastern Trunk Line Association, presided at the meeting, and the traffic officials of the Pittsburgh district were given a chance to pass opinions on the proposed reduction, which would restore the pre-war basis of 60 per cent of the fifth class domestic rate, or 20½c. per 100 lb., against the present tariff of 25½c. It is proposed, however, to make the lower rate effective on carloads of 80,000 lb., against the present minimum carload of 36,000 lb.

During the war, export freight rate preferentials were suspended, but with the understanding that with the ending of the war they would be restored on the pre-war basis. When the railroads did restore preferential rates on export articles, the basis was 70 per cent of the fifth class domestic rates. Efforts have been made ever since to obtain a downward revision of rates, and the carriers now are prepared to make the cut but with an increase in the minimum carload weight.

John Gross, general traffic manager Bethlehem Steel Co., read a prepared paper opposing any change in the export rates out of Pittsburgh on the ground that it would impair the natural advantage of the Eastern steel companies. In reply, traffic officials of Pittsburgh companies pointed out that all export prices are predicated upon a Pittsburgh base, with freight from Pittsburgh to the Atlantic seaboard included, and that, regardless of location, the shipping companies collect the freight from Pittsburgh. In other words, the Pittsburgh "Plus" method of quoting has not disappeared on export business.

There was opposition to the proposed minimum carload on the ground that comparatively few items move in such large quantities. Shippers finally agreed to a counter proposal making the lower rate effective on minimum carloads of 60,000 lb.

L. E. Oliphant, representing the Central Freight Association, took testimony of Pittsburgh, Wheeling, Youngstown, Cleveland and Canton, Ohio, steel companies on a demand for equitable treatment on freight rates with Chicago district mills on shipments of iron and steel articles to Mississippi Valley points.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound
for
Early Delivery

	Oct. 18	Oct. 17	Oct. 15	Oct. 14	Oct. 13	Oct. 11
Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25	13.25
Electrolytic copper, N. Y.* ..	13.00	13.00	13.00	13.00	13.00	13.00
Straits tin, spot, N. Y.	58.62½	57.90	...	58.80	58.10	57.95
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis	6.05	6.05	6.05	6.05	6.05	6.05
Zinc, New York	6.40	6.42½	6.45	6.45	6.45	6.42½
Zinc, St. Louis	6.05	6.07½	6.10	6.10	6.10	6.07½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Oct. 18.—Activities in most of the markets were but slightly interfered with by the Columbus holiday on Oct. 12, although on that day no business was done. Statistics for September for copper, zinc and lead were favorable to producers and these markets are fairly firm. Tin has been quite active at slightly lower levels.

Copper.—After the holiday last Wednesday domestic consumers came into the market and bought electrolytic copper quite liberally for delivery during the remainder of the year at 13.25c., delivered in the Connecticut Valley. While one or two producers have attempted to sell at 13.37½c., the market still stands at 13.25c. today. Last week at the same time foreign producers were active buyers and considerable metal changed hands. Thus far this week, yesterday and today, the market has been very quiet, with little inquiry from either domestic or foreign sources. On Saturday, Oct. 15, Copper Exporters, Inc., advanced their price 10 points to 13.60c., c.i.f. Hamburg. This is regarded as one cause of less buying from abroad this week. September statistics showed a reduction in stocks of refined metal of about 7000 tons and of copper in the blister form of about 6000 tons, making the total reduction in copper above ground about 13,000 tons for the month. Production of ore, however, was at a slightly higher rate than in August and the daily rate of output of refined metal was a little larger than in August. While these facts are in favor of the producers' posi-

tion, consumers point out that current orders for finished products are not very satisfactory. Lake copper is quoted at 13.25c. to 13.37½c., delivered.

Tin.—In spite of the holiday the market last week was active, total sales up to Saturday, Oct. 15, amounting to about 1400 tons. On Oct. 11 and 13 on each day 500 tons was sold and on Oct. 14 over 300 tons changed hands. Consumers bought quite liberally, taking about half of the total, some of it for delivery as far ahead as April and May. There was also some short covering by dealers. The tactics to depress the market, indulged in recently, were absent last week and are not in evidence so far this week. Yesterday the market was dull and easy with about 100 tons sold, and today it is feverish, with considerable buying interest, but with sellers somewhat shy. Only about 100 tons was sold. Spot Straits tin today was quoted at 58.62½c., New York. In London quotations today were considerably lower than a week ago, with spot standard quoted at £261 15s., future standard at £258 12s. and spot Straits at £268 5s. The Singapore price today was £262 5s. Arrivals thus far this month have been 3235 tons, with 6735 tons reported afloat.

Lead.—Fairly firm is the general appraisal of the market, with business done in the outside market at 6.05c. to 6.07½c., St. Louis. Lead has also been sold in the East at 6.30c. The leading interest continues to quote 6.25c., New York, as its contract price, but independent sellers are not meeting this level. Statistics for September show that stocks of refined metal were reduced about 6000 tons from August and that production was cut nearly 7500 tons. The figures seem to indicate that consumption and reduction are now on a more even basis than for some time.

Zinc.—Data for September show that stocks were reduced about 310 tons from August, according to the American Zinc Institute. They also show that the reduction in output has progressed further, the average

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	60.50c. to 61.50c.
Tin, bar	62.50c. to 63.50c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.75c. to 10.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) ..	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy ..	26.00c. to 27.00c.
Babbitt metal, commercial grade ..	30.00c. to 40.00c.
Solder, ½ and ⅓	39.50c. to 40.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits Pig	64.00c.
Tin, bar	66.00c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	7.75c.
Lead, American pig	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	67.25c.
Solder, ½ and ⅓	37.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier ..	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes	26.25c. to 27.25c.
Brass rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets, (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since the advances of Aug. 3. Zinc sheets and lead full sheets are being quoted at the levels established on Aug. 5 and Oct. 5 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to
75c. per 100 Lb. Allowed on Shipments
of 500 Lb. or Over

Sheets—	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.
Rods—	
High brass	16.00c.
Naval brass	18.75c.
Wire—	
Copper	15.25c.
High brass	18.75c.
Copper in Rolls	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

number of retorts operating having been 2000 less than in August, and the total production in September 1277 tons less than in August. Prime Western zinc, after selling the latter part of last week at 6.10c., St. Louis, has declined to 6.05c., and yesterday and today a fair turnover is reported. Ore is quoted unchanged at \$38, Joplin, with production and sales practically unchanged from that of the week before.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Antimony.—Chinese metal for spot delivery is a little easier at 11.25c., New York, duty paid, with futures quoted at 11.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 18.—Sales, though individually small, have been numerous in this market and prices generally are stronger. The demand for lead and zinc is brisk. The old metal market is more active than in several months past.

Prices, per lb., in carload lots: Lake copper, 13.50c.; tin, 60c.; lead, 6.15c.; zinc, 6.20c.; in less-than-carload lots, antimony, 13c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

Intercoastal Rates on Steel Revised Downward

SAN FRANCISCO, Oct. 17.—Intercoastal rates on steel have been readjusted as a result of demands by independent steel companies which were dissatisfied with the advance in ocean freight charges that became effective Aug. 1. The revised rates are 5c. per 100 lb. lower than the regular tariff and apply only to contracts extending until Feb. 29, 1928.

The new rates from North Atlantic ports on carlot shipments are as follows, per 100 lb.: Item No. 1885, bands, bars, hoops, etc., "A" lines, 35c., "B" and "C" lines, 30c.; No. 1888, bolts, nuts, bars, 35c.; No. 1940, billets, blooms, ingots, muck bars, A lines, 35c., B and C lines, 30c.; No. 1995, bolts, lag bolts, nut bolts, etc., 35c.; No. 2020, boiler heads and ends, plates and sheets, No. 16 gage or thicker, A lines, 35c., B and C lines, 30c.; No. 2025, plates and sheets, No. 17 gage or thinner, A lines, 45c., B and C lines, 40c.; No. 2030, plates and sheets, A lines, 40c., B and C lines, 35c.; No. 2055, pig iron, A lines, 30c., B and C lines, 25c.; No. 2100, nails, spikes, wire, 35c.; No. 2125, plates, angles, bars, channels, etc., A lines, 35c., B and C lines, 30c.; No. 2170, structural iron and steel fabricated, A lines, 50c., B and C lines, 45c.; No. 3060, wrought iron pipe, boiler tubes, not more than 12 in. in diameter and not more than 35 ft. long, A lines, 35c., B and C lines, 30c.; wrought iron pipe, boiler tubes, not more than 12 in. in diameter and more than 35 ft., but not more than 42 ft. long, A lines, 40c., B and C lines, 35c.

The Gulf conference of intercoastal steamship companies has also adopted the foregoing contract rates except that the Gulf lines quote the lower rate when two rates are given by the North Atlantic lines.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	9.00c.	10.25c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

FABRICATED STRUCTURAL STEEL

56,000 Tons in Hudson River Bridge—25,000 Tons Pending in Four Toronto Buildings

Award of 56,000 tons of fabricated structural steel for a bridge across the Hudson River at New York brought the week's total, which otherwise has been considerably below the average of recent weeks, to 77,900 tons. This total also included a hotel at Montreal, Canada, which took 5500 tons. New pending work amounted to more than 43,300 tons, but 25,000 tons of this total is accounted for by a hotel and three office buildings at Toronto, Canada. Awards follow:

NEW YORK, 56,000 tons, bridge over Hudson River from Fort Washington to Fort Lee, N. J.; 39,000 tons in towers and 17,000 tons in flooring, to McClintic-Marshall Co.

NEW YORK, 1100 tons, apartment building at Washington Square and Thompson Street, to Bethlehem Fabricators, Inc.

STATE OF NEW YORK, 900 tons, highway bridge, to McClintic-Marshall Co.

STATE OF NEW JERSEY, 500 tons, highway bridge at Somers Point, to Pittsburgh-Des Moines Steel Co.

LEHIGH VALLEY RAILROAD, 350 tons, bridge at Newark, N. J., to Bethlehem Steel Co.

PHILADELPHIA, 125 tons, bridge at Fifty-first Street, to Belmont Iron Works.

CLEVELAND, 2000 tons, Prospect Avenue viaduct for Cleveland Union Terminals Co., to Mount Vernon Bridge Co.

MINNEAPOLIS, MINN., 500 tons, section 5 of the Foshay Tower Building, to Minneapolis Steel & Machinery Co.

CONCORD, MASS., 110 tons, Boston & Maine Railroad bridge to Boston Bridge Works, Inc.

MONTREAL, 5500 tons, new Chateau Laurier, to Dominion Bridge Co.

ALBANY, N. Y., 400 tons, grandstand for Capitol District Baseball Association, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 260 tons, Standard Plate Glass Co. building, to Pittsburgh-Des Moines Steel Co.

PITTSBURGH, 325 tons, Tuberculosis League Hospital addition, to McClintic-Marshall Co.

HOMESTEAD, PA., 100 tons, factory building for Mesta Machine Co., to Massillon Bridge & Structural Co.

SHARON, PA., 800 tons, machine shop for Sharon Steel Hoop Co., to Pittsburgh Bridge & Iron Co.

YOUNGSTOWN, OHIO, 1200 tons, boiler house for Youngstown Sheet & Tube Co., to Pittsburgh-Des Moines Steel Co.

CINCINNATI, 750 tons, American Druggists Fire Insurance Association building, to McClintic-Marshall Co.

BIRMINGHAM, 1000 tons, bridge near Margerum, Ala., to Virginia Bridge & Iron Co.

SIoux CITY, IOWA, 120 tons, addition to power house of the Sioux City Gas & Electric Co., to Mississippi Valley Structural Steel Co.

CHICAGO, 1300 tons, apartment building at 1530 Lake Shore Avenue, to Duffin Iron Co., local.

PASADENA, CAL., 1200 tons, office building, to Virginia Bridge & Iron Co.

LOS ANGELES, 1200 tons, Foreman & Clark building, to McClintic-Marshall Co.

LOS ANGELES, 1100 tons, plates for 84-in. hammer welded pipe, to United States Steel Products Co.

LOS ANGELES, 375 tons, plates for 84-in. riveted pipe, to Lucy Mfg. Co.

LOS ANGELES, 200 tons, bridge for San Gabriel Canyon Railroad, to Virginia Bridge & Iron Co.
 SANTA MONICA, CAL., 1100 tons, Hotel Miramar, to Virginia Bridge & Iron Co.
 SAN FRANCISCO, 200 tons, apartment building on Broadway, to Central Iron Works.
 OAKLAND, CAL., 172 tons, music building, Mills College and Berkeley Veterans Memorial, to Herrick Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 500 tons, Union Trust Co. building.
 ATTLEBORO, MASS., 100 tons, paper mill.
 STORRS, CONN., 200 tons, building for Connecticut Agricultural College.
 NEW YORK, 1400 tons, apartment building at West End Avenue and 100th Street.
 NEW YORK, 600 tons, garage at Northern Boulevard and Forty-fifth Street, Queens.
 NEW YORK, 100 tons, addition to Lincoln Hospital at Concord Avenue and 141st Street.
 NEWARK, N. J., 2300 tons, State highway bridge; New Jersey Asphalt & Paving Co. low bidder.
 AKRON, OHIO, 500 tons, hospital.
 CLEVELAND, 700 tons, bridge for New York, Chicago & St. Louis Railroad.
 CHICAGO, 150 tons, auditorium in LaFollette Park.
 CHICAGO, 225 tons, Mayfair pumping station.
 HARRISON, N. J., 1100 tons, factory building for Intertype Corporation.
 OCEAN CITY, N. J., 2000 tons, highway bridge for State of New Jersey.
 STATE OF NORTH CAROLINA, 250 tons, highway bridge.
 TORONTO, ONT., 7000 tons, office building and printing plant for Toronto Daily Star.
 TORONTO, 8000 tons, Canadian Pacific Railway Hotel.
 TORONTO, 5000 tons, Canadian Bank of Commerce building.
 TORONTO, 5000 tons, Commerce and Transportation building.
 JOLETT, ILL., 110 tons, Young Men's Christian Association building.
 CHICAGO, 8000 tons, St. Theresa Hospital.
 PADUCAH, KY., 2000 tons, bridge.
 BOISE, IDAHO, 100 tons, bridge at Indian Cove, over Snake River; bids received.
 SAN FRANCISCO, 300 tons, short pipe, United States Engineer's Office; bids opened.

Structural Steel Bookings in September Fall Below August

WASHINGTON, Oct. 18.—Bookings of fabricated structural steel in September aggregated 208,242 tons, or 76 per cent of shop capacity, according to reports received by the Department of Commerce from 180 fabricating firms with a monthly capacity of 273,455 tons. This compares with orders for 218,420 tons, representing 78 per cent of capacity, received by 202 firms with a capacity of 280,320 tons, in August.

Computed bookings in September were placed at 241,680 tons, against 248,040 tons in August. Shipments were 248,040 tons, or 78 per cent of capacity, in September, compared with 260,760 tons, or 82 per cent of capacity, in August.

Computed bookings for the nine months ended September were 2,047,920 tons, against 1,930,260 tons for the corresponding period last year.

Sharp Reductions in Output of Steel Barrels

WASHINGTON, Oct. 18.—Production of steel barrels in September totaled 521,899 units, compared with 615,152 in August, according to reports received by the Department of Commerce from 27 companies owning or operating 31 plants. Unfilled orders at the end of September for delivery within 30 days amounted to 235,181 barrels, against 244,518 in August; while unfilled orders for delivery beyond 30 days were 889,256 and 862,086 barrels respectively. Shipments for the two months were 525,374 barrels in September and 610,454 barrels in August. Stocks on hand the first of each month were 57,413 barrels in September and 52,715 barrels in August, while stocks on hand at the end of each month were respectively 53,938 and 57,413 barrels.

REINFORCING STEEL

Awards Considerably Below Recent Weeks—8500 Tons in New Projects

Awards of concrete reinforcing bars, as reported to THE IRON AGE in the last week, aggregated only 3350 tons, the lowest since early September. Pending work, however, totaling 8500 tons, was ahead of the fall average and included several jobs of 1000 tons or more. Awards follow:

HARTFORD, CONN., 300 tons, Catholic seminary, to Truscon Steel Co.
 STILLWATER, MINN., 100 tons, State prison, to American System of Reinforcing.
 CHICAGO, 425 tons, Chicago Nash Co. building, to Barton Spiderweb System.
 JOLETT, ILL., 145 tons, Y. M. C. A. building, to Jones & Laughlin Steel Corporation.
 CHICAGO, 1000 tons, West Side sewer work, to Olney J. Dean & Co.
 MILWAUKEE, 335 tons, LaSalle apartment building, to Concrete Engineering Co.
 IDAHO FALLS, IDAHO, 128 tons, Snake River bridge, to an unnamed company.
 VANCOUVER, B. C., 300 tons, bridge river tunnel, to an unnamed company.
 LOS ANGELES, 260 tons, apartment on Normandie Avenue, to an unnamed company.
 SACRAMENTO, CAL., 257 tons for paving near Pismo, to an unnamed company.
 OAKLAND, CAL., 108 tons, portal buildings at estuary tube, to Steel Service Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 300 tons, loft building on Forty-seventh Street; Frank S. Parker, architect.
 MINNOLA, N. Y., 300 tons, barracks at Michell Field; general contract in part to Murch Brothers, St. Louis.
 PERTH AMBOY, N. J., 1000 tons, concrete decks for bridge over Staten Island Sound from Perth Amboy to Tottenville, S. I.; Cornell Contracting Co., low bidder.
 ELIZABETH, N. J., 820 tons, concrete decks for bridge over Arthur Kill from Elizabeth to Howland Hook, S. I.; Albert A. Volk, Inc., low bidder.
 BUFFALO, 130 tons, school No. 9.
 BUFFALO, 500 tons, Huron Cement Co., storage warehouse; general contractor, John W. Cowper Co., Inc.
 BUFFALO, 500 tons, General Electric Co., new unit for River Road plant.
 NIAGARA FALLS, N. Y., 100 tons, vocational school; bids due Oct. 25.
 AKRON, OHIO, 400 tons, hospital.
 CLEVELAND, 1300 tons, storage building for City Ice & Fuel Co.
 DAYTON, OHIO, 1200 tons, sewage disposal plant.
 STICKNEY, ILL., 1000 tons, requirements of the Sanitary District; Pachon Brothers general contractors.
 CHICAGO, 400 tons, Kelly High School; A. & E. Anderson low bidders on general contract.
 LOS ANGELES, 600 tons, Big Dalton Creek dam, bids Oct. 31.
 LOS ANGELES, 250 tons for municipal work; California Hardware Co. low bidder.

Railroad Equipment Buying

The Southern Pacific has ordered six baggage and mail cars from the Pullman Car & Mfg. Corporation.

The Chicago, St. Paul, Minneapolis & Omaha has withdrawn its inquiry for 250 hopper car bodies and may later inquire for that number of new cars.

The Chicago, North Shore & Milwaukee has purchased 15 passenger coaches, one parlor car and two dining cars from the Pullman Car & Mfg. Corporation.

The Detroit & Toledo Shore Line is inquiring for three or four Mikado type locomotives.

The Carnegie Steel Co. expects to purchase four 70-ton flat cars.

The Missouri-Illinois has ordered two consolidation type locomotives from the American Locomotive Co.

The Newfoundland Railway has appropriated \$250,000 for rolling stock and will soon purchase one or two locomotives, two sleeping cars and three self-propelled cars.

PERSONAL

Evans McCarty, a member of the executive committee and in charge of the foreign affairs of the National Lead Co., New York, has been elected a vice-president of the company, succeeding the late Norris B. Gregg. W. H. Crost, manager of the Magnus Co., a subsidiary of the National organization, has been elected to the board of directors. F. M. Carter, president of the Carter White Lead Co., and W. C. Beschorman, manager of the Cincinnati branch of the National Lead Co., have been transferred to New York as vice-presidents.

Ralph M. Powers, for 19 years associated with the Kewanee Boiler Co., Kewanee, Ill., has purchased the controlling interest in the National Steel Tank & Mfg. Co., Bradford, Ill., manufacturer of pneumatic storage and steel hot water tanks. Mr. Powers will be president of the company and R. D. Lackman will continue as secretary-treasurer.

Max Rachwalsky, of Georg Stenzel & Co., left on the Berengaria after having visited the machine tool and steel treating shows in Cleveland and Detroit, respectively, and called on his American business connections. He helped J. S. Rasmussen of the Zschopauer Motor Works, builder of motor cycles, to purchase some of the machines of the Rickenbacker Motor Co., together with jigs, cutters and drawings to manufacture the Rickenbacker motor in Europe.

W. H. Finkeldey has resigned his position as assistant chief of research of the New Jersey Zinc Co., with whom he has been connected for the past ten years, to become associated with the firm of Singmaster & Breyer, consulting chemical and metallurgical engineers, 420 Lexington Avenue, New York. Mr. Finkeldey has specialized in the processes and problems of the galvanizing industry, the production of zinc base alloys, and the manufacture and uses of rolled zinc.

O. K. Parmiter, metallurgist of the Firth-Sterling Steel Co., is on a business trip to the Pacific Coast and will present a paper on "New Stainless and Alloy Steels" before the Golden Gate Chapter of the American Society for Steel Treating.

J. H. Somerville, until recently in the Philadelphia office of the Reading Iron Co., Reading, Pa., has been appointed associate sales representative of the company at Baltimore, and will represent it in the South. He will be succeeded at Philadelphia by C. M. Barr.

Director General Gross and associates of the Vereinigte Stahlwerke Aktiengesellschaft (the United Steel Works Corporation), Düsseldorf, Germany, which recently made arrangements with the American Rolling Mill Co., Middletown, Ohio, for the use of certain processes, arrived in this country on the Hamburg and are visiting the Armco plants at Middletown; Ashland, Ky., and Butler, Pa.

Max Meltzer, for a number of years with the Continental Iron & Steel Co., New York, iron and steel scrap brokers, has been appointed New York manager for the Hausman & Wimmer Co., Pittsburgh, with office in the Salmon Tower Building, 11 West Forty-second Street, New York.

Richard S. McCaffery, professor of mining and metallurgy, University of Wisconsin, addressed the first fall meeting of the Milwaukee Section of the American Chemical Society, on "The Structure of Blast Furnace Slag."

F. W. Sperr, Jr., research chemist Koppers Co., Pittsburgh, was awarded the Beal Medal of the American Gas Association at its recent convention in Chicago. This medal is awarded annually for the most valuable technical contributions to the industry. Mr.

Sperr is a fellow of the Mellon Institute of Industrial Research, University of Pittsburgh.

Secretary of Labor James J. Davis, who accompanied President Coolidge on the latter's visit to Pittsburgh for the Carnegie Institute Founder's Day exercises, took advantage of the trip to visit the plant of the Weirton Steel Co., Weirton, W. Va., which he inspected with John C. Williams, vice-president and general manager as his guide.

Herbert H. White, formerly in the purchasing department, Brier Hill Steel Co., Youngstown, has joined the Stroh-Butler Co., Stambaugh Building, Youngstown, dealer in raw materials for the steel industry.

E. T. Jones, chief engineer Wright Aeronautical Corporation, Paterson, N. J., will be the speaker at the monthly dinner meeting of the Milwaukee section, Society of Automotive Engineers, at the Milwaukee Athletic Club on Nov. 2.

Richard T. Beglinger, sales engineer Allis-Chalmers Mfg. Co., Milwaukee, will leave Oct. 22 for Sao Paulo, Brazil, to be associated with the Brazilian Trading Co., Rio de Janeiro, for a period of approximately two years. His work will be in relation to the extensive highway construction program being carried out in Brazil and the consequent development of Allis-Chalmers equipment business in that territory.

Dr. Stewart Scrimshaw, professor of industrial relations, Marquette University, Milwaukee, and advisor to the Kearney & Trecker Corporation, spoke on "Co-operative Apprenticeship" at Rockford, Ill., on Oct. 11, before a joint meeting of the Engineering Society, superintendents of machine shops, and the board of education.

P. F. McManus has been appointed general manager of the Elgin, Joliet & Eastern Railway Co., with offices at Joliet, Ill. The office of general superintendent has been abolished.

A. A. Potter, dean of engineering, Purdue University, was the principal speaker at a banquet given on Oct. 5 by the Indianapolis chapter of the American Society for Steel Treating. He discussed "Tendencies in Engineering Education."

J. P. Gill, metallurgist Vanadium Alloys Steel Co., Latrobe, Pa., spoke before the Cincinnati chapter of the American Society for Steel Treating on Oct. 6, his subject being "The History, Development and Treatment of High Speed Steel."

Raymond L. Thompson, recently vice-president of the Atlantic Stamping Co., Rochester, N. Y., which has been merged with the Metalwares Corporation, Chicago, has been elected assistant treasurer of the University of Rochester.

W. R. Tomlinson, formerly vice-president of the Billings & Spencer Co., Hartford, Conn., has been appointed works manager of the Buffalo plant of J. H. Williams & Co.

P. V. Bunn has been appointed vice-president and general manager of the Remington Cash Register Co., Ilion, N. Y. The company was formerly a part of the Remington Arms Co., but the two have been separated and the sales, manufacturing and accounting divisions of the cash register company will continue to function as usual under the direction of Mr. Bunn.

Carl G. Werscheid has been appointed assistant district manager at St. Louis for the Colonial Steel Co., Pittsburgh.

George W. Llewellyn, district manager of sales at Detroit for the Seneca Iron & Steel Co., Buffalo, has resigned, effective Nov. 1, and will act as a manufacturers' agent in the Detroit territory with offices in the General Motors Building, Detroit.

Peter Tazelaar, for the last eight years representative in New York for the Commonwealth Brass Corporation, Detroit, has been appointed sales manager of the company and will be located at the home office.

H. F. George, who has been associated for 25 years with the H. A. Hitner's Sons Co., Philadelphia, most recently as manager of its plate washer department, has resigned to form the Aramingo Plate Washer Co., Aramingo Avenue near Westmoreland Street, Philadelphia, which will manufacture standard and special plate washers and stampings.

James R. Murphy, formerly connected with the SKF Ball Bearing Co., New York, and with the E. W. Bliss Co., Brooklyn, has joined the sales organization of the Triplex Machine Tool Co., 50 Church Street, New York.

W. B. Wallis, president Pittsburgh Electric Furnace Co., Pittsburgh, spoke before the Quad-City Foundrymen's Association on Oct. 17 at the Davenport, Iowa, Chamber of Commerce, his subject being "Electric Furnaces for Gray Iron and Malleable Castings."

James A. Ballard, for several years division sales manager at Detroit, for the Semet-Solvay Co., has resigned, effective Sept. 20. He has been succeeded by James M. Woods.

Jay G. Stephens, formerly associated with Luria Brothers & Co., in its Pittsburgh office, is president of the recently organized Jay G. Stephens Corporation, 318 Oliver Building, Pittsburgh, and will deal in iron and steel products and in scrap iron and steel.

O. W. Carlson, recently purchasing agent at the Los Angeles plant of the American Manganese Steel Co., has resigned to become controller of the Columbia Film Exchanges, Los Angeles. He has been succeeded by A. R. LeMaster, formerly purchasing agent at the Denver, Colo., plant of the American Manganese Steel Co.

R. A. McDowell, formerly in the Pittsburgh office of the Reliance Electric & Engineering Co., Cleveland, has been made Cincinnati district manager for the company. C. D. Herbert, who has been in the Syracuse, N. Y., office of the Reliance company has been made New York district manager.

Herman C. Nelson, who has been appointed purchasing agent for the Rock Island Plow Co., Rock Island, Ill., has been associated with the company for 10 years and at the time of his promotion was on the superintendent's staff in the company's tractor works.

E. R. Kennedy has been made assistant general manager of sales for the Trumbull Steel Co., Warren, Ohio.

T. H. Niver has been appointed purchasing agent of the Bunting Brass & Bronze Co., Toledo, Ohio, succeeding W. F. Volk.

R. P. Hutchinson, president and general manager of the Bethlehem Fabricators, Inc., Bethlehem, Pa., is spending two months in Europe on a tour of France, Italy and Greece.

Karl Eilers, consulting engineer, 233 Broadway, New York, has been elected a director and treasurer of the American Institute of Mining and Metallurgical Engineers to fill out the unexpired term of the late, Charles F. Rand. Mr. Eilers had previously served on the board of the institute and his father was one of its pioneer members. The younger Mr. Eilers was for some time a member of the executive committee of the American Smelting & Refining Co., but is now in private practice. He was graduated from the School of Mines of Columbia University in 1889 and in 1914 received an honorary degree from that institution.

William Richter, since 1925 assistant manager of the paint, lacquer and chemicals department of E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del., has been appointed manager of the department to succeed William P. Allen, who has been granted a year's leave of absence, effective Nov. 1. J. W. Elms, at present divisional manager at Philadelphia, will succeed Mr. Richter and will be succeeded in turn by William M. Zintl, who has been sales director in the paint and varnish division at Philadelphia.

Leon E. Thomas, president of the Thomas Iron Co., Reading, Pa., has been elected a director of the Philadelphia & Reading Coal & Iron Corporation, succeeding George Coughlin. Andrew J. Maloney has been elected president of the corporation, succeeding Joseph Wayne, Jr., who has temporarily filled the office since the resignation of W. J. Richards some months ago.

Charles L. Lawrance, president Wright Aeronautical Corporation, Paterson, N. J., sailed on Oct. 8 for a short business visit in Europe.

Frank A. Burr, New York, has returned from a six months' tour of Europe.

C. W. Avery, chief development engineer of the Ford Motor Co., Detroit, has resigned to become assistant to the president of the Murray Corporation of America, Detroit. He will take over his new duties immediately, which will also connect him with the various Murray affiliated companies, including the J. W. Murray Mfg. Co., Dietrich, Inc., and the Jenks & Muir Mfg. Co. Mr. Avery entered the employ of the Ford organization 15 years ago, starting as a shop student and advancing to the position of associate general superintendent of the Highland Park plant.

C. A. Reed, for the past eight years identified with the Combustion Engineering Corporation, has been appointed Pittsburgh district manager Erie City Iron Works, with office at 1230 Park Building, Pittsburgh. Before going with the Combustion corporation, Mr. Reed was with the Green Engineering Co. for a period of two years.

Charles C. Cluff, district sales manager Carnegie Steel Co., New York, has returned from a stay of some weeks in Europe, spent in part in automobile touring of Germany and the Continent.

J. L. Spitzer, recently head of the J. L. Spitzer Co., 51 East Forty-second Street, New York, dealer in iron and steel, and previously New York manager for the E. B. Leaf Co., has been appointed manager of the scrap iron department of the Debevoise-Anderson Co., 114 Liberty Street, New York.

Gives Veteran Employees a Tour of Inspection

The Morgan Construction Co., Worcester, Mass., had as its guests 75 of its veteran employees on a trip which included in its itinerary the inspection of the steel mills of the Ford Motor Co. at its Fordson Plant, Detroit, and the Lackawanna plant of the Bethlehem Steel Co. at Buffalo. These mills were constructed by the Morgan company, and the men who made up the party played prominent parts in their design and building.

The party left Worcester on special Pullman cars Saturday evening, Oct. 15, and spent Sunday at Niagara Falls. Monday was passed at the Fordson plant, most departments of which were visited, and Tuesday was given over to the Highland Park plant of the Ford company. Wednesday morning the Lackawanna mills were inspected.

The hosts for the company were Jerome R. George, vice-president; Philip M. Morgan, assistant treasurer; John W. Sheperdson, chief engineer, and Ralph L. Morgan, a member of the board of directors. The party returned to Worcester Thursday.

OBITUARY

ARTHUR G. HENRY, who died suddenly at the plant of the Danly Machine Specialties, Inc., Chicago, on Oct. 5, was one of the founders and the first secretary-



A. G. HENRY

treasurer of the American Society for Steel Treating. He was born in Wales and began his career as an apprentice in the laboratory of the Ebbw Vale Iron & Steel Co., Ebbw Vale, Wales. He continued his education at the University of Bonn, in Germany, and worked for a while as an assistant chemist in a large steel plant of the Ruhr Valley. Coming to the United States in 1896, he was engaged for a time in the research laboratory at the South Works, Illinois Steel Co., South Chicago. In 1900 he became foundry chemist for the Featherstone Foundry & Machine Co., Chicago, later purchased by the

American Brake Shoe & Foundry Co. He was the first metallurgist to be employed by the Illinois Tool Works, Chicago, and was largely responsible for the development of that company's heat treating laboratory. In 1920 he organized the Perfection Tool Hardening Co., selling it in 1926 to purchase an interest in the Danly Machine Specialties, Inc., with which he was associated at the time of his death. He was voted a founder membership in the American Society for Steel Treating in 1926 and had been keenly interested in the affairs of the organization since its founding in 1918. At the time of his death he was secretary-treasurer of the Chicago chapter of the society.

EDWIN S. CHURCH, former president of the Wellman-Seaver-Morgan Co., Cleveland, died in Los Angeles, on Oct. 6, aged 53 years. He served as president of the Cleveland company from 1917 until October, 1925, when he became chairman of the board, retaining the latter position until February, 1926. Previous to his affiliation with the Wellman-Seaver-Morgan Co., he was connected with the International Harvester Co. During the past two years he had spent most of his time in Los Angeles.

JAMES C. PICKERING, formerly president of the Cedar Rapids Machinery & Supply Co., Cedar Rapids, Iowa, died on Oct. 5 at the home of his son in Los Angeles. He was 76 years of age and had retired from active business some years ago.

F. STEWART SCOTT, general manager of the Charles B. Scott Co., Scranton, Pa., died on Sept. 13.

CHARLES H. LOVSEY, president of the Charles H. Lovsey Co., 704 Park Building, Pittsburgh, and long prominently identified with the by-products coke industry, died at his home in Pittsburgh on Sept. 22. He received his early training under the direction of Louis Hirt, chief engineer New England Gas & Coke Co., Everett, Mass., and some years later located in the Pittsburgh district.

GEORGE DEVINE PITKIN, president of the Lane Mfg. Co., Montpelier, Vt., manufacturer of woodworking machinery, died on Sept. 28.

ROBERT MACMURRAY, secretary and treasurer of Faucher-MacMurray, Inc., Rochester, N. Y., manufacturer of ornamental and architectural iron, died at his home in that city on Oct. 11. He was born in Brooklyn, Nov. 28, 1885, and was engaged in the iron business in New York until 1912 when he came to Rochester. He helped to organize the Faucher-MacMurray company in 1921.

WILLIAM H. MATTHEWS, JR., Cleveland district sales manager of the Universal Portland Cement Co., a subsidiary of the United States Steel Corporation, died Oct. 16, aged 46 years. He had been connected with the Cleveland office of the company since 1910. He was a member of the Cleveland Chamber of Commerce and of various clubs.

FRANK L. BROWN, first vice-president Columbia Steel & Shafting Co., Carnegie, Pa., and treasurer and



FRANK L. BROWN

active director of its affiliated company, Edgar T. Ward's Sons Co., died at the Metropolitan Hospital, Philadelphia, on Oct. 14, following an attack of acute indigestion. He was in Philadelphia on a business trip. Born in Portsmouth, Ohio, Aug. 6, 1877, Mr. Brown had been identified with the steel industry for 32 years. His great-grandfather was a member of the firm which built one of the country's early blast furnaces at Portsmouth, Ohio, out of which grew the Brown-Bonnell Iron Co. It later was moved to Youngstown, and now is known as the Brown-Bonnell works, Republic Iron &

Steel Co. Mr. Brown started with the Brown-Bonnell company and remained with the Republic Iron & Steel Co. for several years after the merging of the two companies. He joined the Columbia company in 1912. He was a member of the American Iron and Steel Institute and the Society of Automotive Engineers.

CHARLES M. MANLY, engineer, patentee of a hydraulic drive which has found wide application in the machine tool industry, died on Oct. 16 at his home in Kew Gardens, N. Y. He was born at Staunton, Va., in 1876, and shortly after graduation from Cornell University he became associated with Dr. Samuel P. Langley in pioneer aviation development work at the Smithsonian Institute. In 1901 the Langley airplane used his gasoline engine, which was of unprecedented lightness, and he was the pilot and designer of the Langley airplane in the initial experiments of 1903. For many years he practised as a consulting engineer in New York, and was vice-president and chief engineer of the Manly Drive Co. During the World War he served as consulting engineer, chief inspection engineer and assistant general manager of the Curtiss Aeroplane & Motor Co., Inc. In 1919 he was president of the Society of Automotive Engineers. He also served as chairman of the society's aviation division and standards committee. He patented some forty devices used in speed transmission and automotive engineering. Mr. Manly was a member of the American Society of Mechanical Engineers, the Aeronautical Chamber of Commerce, the Engineers Club of New York and of Sigma Xi.

GEORGE W. CORBETT, assistant treasurer of the McClintic-Marshall Co., Pottstown, Pa., died Oct. 15, aged 68. He had been connected with the company since its formation, his association beginning with the purchase by the McClintic-Marshall Co. of the plant of Cofrode & Saylor, Inc., of Pottstown, where he had been since 1887.

Little Activity in European Markets

British Conditions Spotty, While French Complain
of High Production Costs

(By Cable)

LONDON, ENGLAND, Oct. 17.

CLEVELAND pig iron activity is being maintained, but makers are still hesitant to increase output as stocks are fairly large, although current output is being easily absorbed.

Hematite continues weak and inactive, competition among makers having increased by the prospects of expanded output. Foreign ore continues dull.

Finished steel is moderately active as a result of new shipbuilding orders, but plate mills are still in need of specifications as demand has been insufficient to absorb their productive capacity. The lighter industries are moderately well employed with domestic orders but export demand generally is slack.

September exports of pig iron were 24,289 tons, of which the United States took 450 tons. Total exports of all kinds of iron and steel were 384,919 tons.

Tin plate is weak as a result of sales by makers anxious to resume operations. Pool payments have been suspended. As low as 17s. 7½d. (\$4.28) per base

box, f.o.b. works port, has been accepted. A revival of general demand has not yet appeared although the Far East is purchasing moderately from mills able to furnish the specifications required. Welsh interests are considering the possibility of reviving minimum prices, but such a development at present seems unlikely.

Galvanized sheets are dull. Calcutta, India, stocks are reported to total more than 20,000 tons, so that little fresh demand from that market is anticipated for some time. Some makers, in need of orders, are inclined to shade prices. Black sheets are quiet generally.

There is some inquiry for Continental semi-finished material by British consumers and increasing demand from overseas markets for finished iron and steel, but Continental makers are not keen sellers at current prices. The meeting of the steel cartel scheduled for today in Brussels has been postponed because of the inability of Belgian makers to reach an agreement among themselves. The International Wire Syndicate will be dissolved Oct. 31.

CARTEL MEETING SATISFACTORY

German Penalties Reduced One-Half—Export
Quotas and Price Control Discussed

HAMBURG, GERMANY, Oct. 1.—From the German viewpoint, the meeting of the International Steel Cartel, Sept. 26 to 28, in Luxemburg, was a complete success. It is believed that with the meeting there came an end to the disastrous competition of the four leading Continental steel producing countries, which had brought export prices below the level of 1913. At the same time, the penalties for overproduction to be paid by German producers were reduced from the former fine of \$2 per ton to \$1 per ton.

This reduction in the amount of the penalties to be paid by Germany for overproduction is considered by the German mills to be quite fair as the greater part of the German output is being absorbed domesti-

cally. The outstanding feature of the meeting was the unanimity of opinion that the present severe competitive conditions must cease. German export at present is but an insignificant part of the total output compared with 1926, and even with 1925, and the German steel industry can compete now only when the works are operating at full capacity.

Wages, taxes and other costs are higher than in the western steel producing countries and the distance to seaports is twice to three times as great as in the chief Belgian steel producing centers. It was pointed out, therefore, that to compete for export business, Germany must maintain high operating rates to reduce costs as far as possible. This was apparently realized at the Luxemburg meeting, and the representatives of the other steel producers of Europe contemplated the outlook of a vigorous competition by Germany to secure more export business in Europe through high operations and reduced costs.

As a result of the discussions, it is understood that

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 18s.		\$4.37	
Bilbao Rubio orf.	1 1	to £1 1½s.	5.10	to \$5.16
Cleveland No. 1 fdy.	3 10		17.01*	
Cleveland No. 3 fdy.	3 7½		16.40*	
Cleveland No. 4 fdy.	3 6½		16.16*	
Cleveland No. 4 forge	3 6		16.04*	
Cleveland basic (nom.)	3 15	to 3 15½	18.23	to 18.35
East Coast mixed...	3 12½	to 3 14	17.62	to 17.98
East Coast hematite	3 13	to 3 14½	17.74	to 18.10
Rails, 60 lb. and up.	7 15	to 8 0	37.67	to 38.88
Billets	6 0	to 6 10	29.16	to 31.59
Ferromanganese	12 15	to 13 0	61.97	to 63.18
Ferromanganese (export)	11 0	to 11 10	53.46	to 55.89
Sheet and tin plate bars, Welsh	5 7½	to 5 15	26.12	to 27.95
Tin plate, base box...	0 17½	to 0 18½	4.28	to 4.43
Black sheets, Japanese specifications.	13 15	to 14 0	66.83	to 68.04
			C. per Lb.	
Ship plates	7 12½	to 8 2½	1.65	to 1.76
Boiler plates	10 10	to 11 0	2.28	to 2.39
Tees	8 2½	to 8 12½	1.76	to 1.87
Channels	7 7½	to 7 17½	1.60	to 1.75
Beams	7 2½	to 7 12½	1.55	to 1.65
Round bars, ¾ to 3 in.	7 12½	to 8 2½	1.65	to 1.76
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	10 5	to 10 10	2.22	to 2.28
Galv. sheets, 24 gage	13 15	to 14 0	2.98	to 3.03
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.03	to 3.09

*Export price, 2½s. less for 500 tons or more.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron:(a)				
Belgium	£2 18s.	to £3 0s.	\$14.08	to \$14.58
France	2 18	to 3 0	14.08	to 14.58
Luxemburg	2 18	to 3 0	14.08	to 14.58
Basic pig iron:				
Belgium	2 17	to 2 17½	13.83	to 13.96
France	2 17	to 2 17½	13.83	to 13.96
Luxemburg	2 17	to 2 17½	13.83	to 13.96
Coke	0 18		4.37	
Billets:				
Belgium	4 3	to 4 5	20.17	to 20.67
France	4 3	to 4 5	20.17	to 20.67
Merchant bars:				
Belgium	4 12	to 4 13	1.02	to 1.03
France	4 12	to 4 13	1.02	to 1.03
Luxemburg	4 12	to 4 13	1.02	to 1.03
Joists (beams):				
Belgium	4 10	to 4 12	0.99	to 1.02
France	4 10	to 4 12	0.99	to 1.02
Luxemburg	4 10	to 4 12	0.99	to 1.02
Angles:				
Belgium	4 12		1.02	
¾-in. plates:				
Belgium (a)	6 5	to 6 6	1.38	to 1.39
Germany (a)	6 5	to 6 6	1.38	to 1.39
¾-in. ship plates:				
Belgium	6 1	to 6 2	1.33	to 1.34
Luxemburg	6 1	to 6 2	1.33	to 1.34
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

the Saar, Luxemburg and Belgium will suspend exports of finished products to Germany, as Germany is at present importing 200,000 to 250,000 tons a month of finished materials. A further agreement is understood to have been the fixing of allotments and prices in the international steel market, which is expected to give more stability to export trade. As compensation, German mills agreed to reduce exports of finished steel and semi-finished materials during the fourth quarter.

The result of the meeting is believed in Germany to have been the first step toward a genuine international agreement, as a result of which it will in the future be impossible for foreign buyers to purchase steel at less than the 1913 prices.

FRENCH COSTS HIGH

Increase in Iron and Steel Prices Since War Less Than High Cost of Raw Materials

PARIS, FRANCE, Oct. 7.—A large metallurgical association has recently compiled statistics on the increase in cost of raw materials and labor in France since 1914. The comparison shows that metallurgical coke is now 5.5 times the pre-war cost, coal, depending upon its origin, 5.8 to 6.5 times, ferromanganese 6.4 times, manganese ore 8.5 times and labor 5.25 to 5.50 times the pre-war level. The general increase in expense per ton of finished products is set at 6.3 times the 1914 cost. In 1914 the total of taxes per ton of finished products was 2 fr., while today it is 50 fr., making the present rate 25 times the pre-war.

In comparing selling prices, beams, rails, merchant bars and heavy and light gage sheets are found to be selling at four times the 1914 level of prices, which, it is pointed out, should justify an advance of about 50 per cent in price, based on the volume of increase that has taken place in the cost of raw materials. However, production costs, as a result of technical improvements in the plants, have been reduced somewhat, although this decrease in costs has been offset by the increase in taxes.

While there has been no improvement in the domestic market, export business is somewhat steadier as a result of the report that negotiations for the formation of separate sales syndicates for beams and semi-finished materials are progressing. This has led to a greater show of strength on the part of sellers, but the decision of the International Steel Cartel to maintain the third quarter rate of output in the fourth quarter has not been favorable to stability of prices. Producers, however, believe that stocks in the hands of consumers are gradually being depleted and that more active purchasing is in prospect.

Pig Iron.—In export business British competition is keen with No. 3 Cleveland foundry, which sells in the United Kingdom at £3 7s. 6d. (\$16.40), quoted for export at £3 5s. (\$15.80) per gross ton. British furnaces have made some important contracts with Italy on hematite iron. During the first eight months of this year French imports of pig iron have shown a considerable increase over the imports in the same period of 1926. The total this year was 25,783 tons compared with 16,584 tons last year. Exports, however, were also higher with 591,797 metric tons in the first eight months of this year compared with 440,426 tons in the same period of 1926.

Semi-Finished Material.—Production of ingots in August was slightly in excess of the July output. Export sales of billets and blooms are in moderate volume and the price of blooms shows a slight tendency to weakness, with quotations off in many cases about 6d. per ton at £3 17s. to £4 1s. (\$18.70 to \$19.68) per ton, f.o.b. Antwerp. Billet prices are irregular, with some mills in need of tonnage and willing to offer concessions. Quotations range from £4 2s. 6d. to £4 4s. 6d. (\$20.05 to \$20.53) per ton, f.o.b. Antwerp.

Finished Material.—There is great inequality in the backlog of orders on the books of various mills. Among mills in the East export orders have placed them in a fairly independent position, but in the North more business is needed and concessions are frequent. Competition is naturally keen, with mills in many instances

invading the merchants' field and selling directly to the small consumers. For export beams continue quiet at £4 8s. to £4 8s. 6d. (0.97c. per lb.) for ordinary specifications. Bars are quoted by both German and French sellers at £4 12s. to £4 12s. 6d. per ton (1.01c. to 1.02c. per lb.) and by Belgium mills at £4 12s. 6d. to £4 13s. per ton. (1.02c. to 1.03c. per lb.). Concrete bars range from £4 11s. to £4 12s. per ton (1c. to 1.01c. per lb.). There is no improvement in the domestic sheet market, but for export quotations are fairly well maintained. With the wire rod cartel formed at a meeting in Liege on Oct. 4, prospects of agreement between French and British producers seem good. At this meeting an export price of £5 10s. per ton (1.21c. per lb.) was accepted by the producers for quotations to agents and to consumers.

Austria Increasing Alloy Steel Exports

VIENNA, AUSTRIA, Oct. 2.—The steel industry has lately been successful in increasing exports of alloy steel of such brands as Boehler and Schoeller. Most of the alloy steel production of the former Austro-Hungarian Empire is contained in the present territory, and with consumption considerably reduced, it has been necessary to increase exports considerably. Formerly exports of alloy steels were largely confined to a few neighboring countries.

In the past two years exports have been increased to Japan, South Africa, South America and other world markets. Exports in the first eight months of this year were greater than in all of 1926 and exceeded the 1925 shipments by 60 per cent. Total exports during the first six months of this year of vanadium, molybdenum, titanium, wolfram, tungsten and chromium bearing steels exceeded 14,000 tons. Of the total output of alloy steels, three companies exported 41 per cent in 1925, 54 per cent in 1926 and 67 per cent this year.

German Non-Ferrous Mills Plan Bounties for Export

HAMBURG, GERMANY, Oct. 1.—In an effort to aid exports of non-ferrous metal sheets, bars, wires, cables and similar products, the German finishing mills are negotiating with the foundries and rolling mills in order to form a syndicate, similar to those in the steel industry.

It is suggested that the foundries and rolling mills pay to the finished products manufacturers a bounty, representing the difference in prices between the domestic and export markets on all sales to foreign consumers. This bounty, as in the steel industry, would be fixed monthly.

The use of coppered steel is rapidly increasing in Germany when corrosion resistance is required, as prices have been reduced several times recently. At present the cost to the consumer is only about 12 per cent more than the plain steel price. It is reported that coppered steel will be offered on a large scale for export and with an extensive publicity campaign in foreign fields under consideration a considerable increase in exports is expected.

Ferrosilicon Syndicate Advances Export Prices

HAMBURG, GERMANY, Oct. 1.—The Continental Ferrosilicon Syndicate has increased its prices for export to Great Britain and the United States about 5s. (\$1.22) per ton. Business is reported to be active, following the quietness of the market in the summer. Very little disturbance of market conditions is noted from the competition of French or Italian non-members of the syndicate.

A meeting of the subcommittees of committee A-1 on steel of the American Society for Testing Materials is scheduled for Oct. 20 and 21 in Philadelphia.

Machinery Markets and News of the Works

CONDITIONS SPOTTY

Inquiry on Hand Continues in Fair Volume

Shipping Board Expected to Close on a Number of Engine Lathes

FAIR business is reported from most districts, with an encouraging number of inquiries on hand. In the Cincinnati district the total orders placed are said probably to be better than during the first part of last

month, but not all builders are participating. More activity, both as to sales and inquiry, is noted in the Cleveland territory. The orders placed have been for the most part for one or two machines.

Definite action by some buyers having programs calling for considerable new equipment is said to be held up awaiting a more favorable general industrial situation. Other buyers are requesting prices for use in connection with the preparation of budgets for 1928. Business expected to be closed shortly includes seven engine lathes for the United States Shipping Board, for Pacific Coast delivery.

New York

NEW YORK, Oct. 18.

INQUIRY continues in fair volume, but business is spotty, several days of active inquiry and a few purchases being interspersed with several days of quiet. Airplane engine manufacturers continue as purchasers of single tools, the local New Jersey company being the principal buyer. Used machine tools are in good demand. The railroads are still inactive, except for the New York Central, which continues as a purchaser of single tools. Among reports of sales of tools to industrial users in the past week, jig borers and centerless grinders have been prominent.

Large jig borders have been purchased by a Providence, R. I., tool maker, a company in Jamestown, N. Y., a machine tool builder in Bridgeport, Conn., and a Saginaw, Mich., company, which purchased a rebuilt machine. Among purchasers of small jig borers were a Bridgeport, Conn., electrical manufacturer, a Bristol, Conn., company, and a Milwaukee manufacturer. The last mentioned also closed on a 62-in. heavy boring and turning mill and two 18-in. x 8-ft. engine lathes. Two manufacturers in Connecticut have closed in the past week on large centerless grinders.

Among other purchases of machine tools, a Chicago company closed on a 3-spindle and a 2-spindle drill, an airplane engine manufacturer in New Jersey purchased a 6 x 20-in. thread milling machine, a Cleveland company bought two tool makers' lathes, 13 x 30-in. and 13 x 36 in., a Torrington, Conn., machine tool builder placed a 6-in. x 32-in. thread milling machine, a steel mill in Erie, Pa., closed on a used 16 in. x 18-ft. lathe and a 14-in. shaper, a Los Angeles company bought a broaching machine and an Indiana electrical manufacturer purchased two high speed, single spindle tapping machines. Among sales of used tools, a Chicago manufacturer closed on a used Niles 6-ft. boring and turning mill and a used LeBlond 21-in. x 12-ft. lathe and a coal company in West Virginia purchased a used Clement band saw.

The Department of Correction, 353 Broadway, Albany, N. Y., is asking bids until Nov. 1 for an electric generator for installation at the Great Meadows prison, Comstock, N. Y., as per specification 4995, on file at the office of the State architect, Capitol Building, Albany, and 949 Broadway, New York.

The Meurer Steel Barrel Co., 23 East Forty-third Street, New York, has asked bids on a general contract for alterations and improvements in its factory at Long Island City, reported to cost about \$20,000. Allmendinger & Schlendorff, 552 Monroe Street, Brooklyn, are architects.

The Quartermaster, Second Corps Area, Governors Island, N. Y., is asking bids until Nov. 2 for electric generators of Diesel type, with engines to drive 20 kw. generating units.

The Carpenter-Tew Gear Co., 67 Thirty-fifth Street, Brooklyn, manufacturer of gears, has leased space in Building No. 5, at the industrial group of the Bush Terminal Co., South Brooklyn, for expansion.

The Park-Yorkville Garage, Inc., New York, has concluded negotiations for the purchase of a four-story service, repair and garage building, 100 x 125 ft., at 151-59 West 108th Street, for about \$500,000, and will operate a works at that location.

The Keiner-Williams Stamping Co., 8746 123rd Street, Richmond Hill, L. I., manufacturer of metal stampings, etc., has awarded a general contract to the Caye Construction Co., 356 Fulton Street, Brooklyn, for a one-story and basement addition, to cost \$75,000 with equipment.

Hugh L. Cooper & Co., 101 Park Avenue, New York, consulting engineers, are in charge of a power project to be carried out on the upper Columbia River, Pend Oreille County, Wash., where site has been selected. The work will include power dam, generating station with ultimate output of more than 500,000 hp., steel tower transmission lines, etc., and is reported to cost upward of \$4,000,000.

The Mansfield Iron Works, Inc., 878 East Forty-third Street, Brooklyn, has acquired property fronting on the East Mill Basin, Bergen Beach section, as a site for a new structural steel fabricating plant. A department for ornamental iron production will be installed. The new works are reported to cost in excess of \$50,000 with equipment. It is understood that the present plant will be removed to the new location.

Franklin, Bates & Heindsmann, 252 Webster Avenue, New York, architects, have plans for a new two-story automobile service, repair and garage building, 100 x 120 ft., to cost close to \$100,000 with equipment.

Weinberger & Welshoff, 247 Park Avenue, New York, architects, have completed plans for a new multi-story automobile, service and repair building, 105 x 200 ft., to cost approximately \$140,000 with equipment.

The Board of Education, 500 Park Avenue, New York, is reported planning the installation of manual training equipment in the proposed three-story Samuel J. Tilden High School, Brooklyn, to cost \$2,400,000. William H. Gompert, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

The Board of Freeholders, Freehold, N. J., is considering the installation of a new pumping plant in the vicinity of Keyport, for county service, to cost more than \$20,000 with machinery.

The Carrier Engineering Corporation, 750 Frelinghuysen Avenue, Newark, N. J., manufacturer of air conditioning equipment, etc., has arranged for a preferred stock issue to total \$1,350,000, a portion of the proceeds to be used for expansion in plant facilities.

The Board of Education, West Orange, N. J., contemplates the installation of manual training equipment in its proposed new junior high school to cost about \$250,000.

Guilbert & Betelle, 24 Branford Place, Newark, are architects.

The Inwood Consumers' Ice Mfg. Corporation, Verona, N. J., has plans for a new one-story ice-manufacturing plant, 100 x 125 ft., to cost more than \$60,000 with machinery.

Hyman Friedman, receiver for the Schantz-Eckert Co., Inc., Water and Front Streets, Perth Amboy, N. J., manufacturer of mechanical equipment, will offer the property of the company at a public sale on Nov. 2, including machine and blacksmith shop, foundry, traveling cranes and other equipment.

The Rubberstone Corporation, 1 Madison Avenue, New York, manufacturer of flooring, etc., has awarded a general contract to the Armoboard Co., Inc., Hillside, N. J., for a new one-story plant at Hillside, 60 x 175 ft., to cost close to \$40,000 with equipment.

The Lehigh Valley Railroad, Bay Avenue, Newark, N. J., has taken out a permit for a new one-story boiler plant at its local terminal, to cost about \$50,000 with equipment.

Charles C. Phelps, combustion engineer, Paterson, N. J., has removed his office to room 528, 30 Church Street, New York, and will continue to act as representative for the Power Plant Equipment Co., maker of Marley superheaters and steam purifiers; the Uehling Instrument Co., maker of carbon dioxide recorders and vacuum records; the combustion control division of the A. W. Cash Co.; the Williams Gauge Co., maker of regulators, alarm columns, governors, traps, etc.; Ellison draft gages, Girth steam protectors for H. R. T. boilers; smoke indicators, and remote water level gages.

The Mulberry Metal Stamping Works, 352 Mulberry Street, Newark, N. J., has been reorganized to manufacture Van Hix garage door holders and to do metal stamping and machine work in general.

The Banks Steel Post Co., 128 Wakeman Avenue, Newark, has been organized to manufacture steel clothes posts, radiator ornaments and other products which are now on the market.

The Fire Ball Mfg. Co., Inc., Lambertville, N. J., has been organized to manufacture a radiant gas water heater and is making all parts in its plant except the radiants. The company has purchased a plant in Lambertville.

Philadelphia

PHILADELPHIA, Oct. 17.

THE J. Warren Watson Co., Twenty-fourth and Locust Streets, Philadelphia, manufacturer of automobile shock absorbers, etc., has plans under way for a one-story addition, to cost more than \$65,000 with equipment. The company recently disposed of a stock issue of \$4,900,000, a portion of the funds to be used in connection with an expansion program. The Ballinger Co., 105 South Twelfth Street, is architect and engineer.

The Pennsylvania Railroad Co., Philadelphia, has authorized plans for a new cold storage and refrigerating plant at its produce terminal at Delaware and Oregon Avenues, to be eight stories, 110 x 800 ft., with cold storage department approximating 2,000,000 cu. ft. capacity, reported to cost in excess of \$1,200,000 with equipment. The Day & Zimmermann Engineering & Construction Co., Sixteenth and Walnut Streets, is engineer. W. H. Cookman is company architect, in charge. It is purposed to ask bids on a general contract early in December.

The School District of Upper Darby Township, Drexel Hill, Pa., Arthur Garrett, president, plans the installation of manual training equipment in a proposed new junior high school to cost close to \$750,000 with equipment.

The Philadelphia Rapid Transit Co., Broad and Locust Streets, Philadelphia, has filed plans for a one-story machine shop at its car repair works on Wyoming Avenue, to cost approximately \$75,000 with equipment.

The Board of Education, Bridgeton, N. J., is considering the installation of manual training equipment in a proposed new high school to cost \$265,000, for which bids will be asked soon on a general contract. Edwards & Green, 548 Federal Street, Camden, N. J., are architects.

Officials of the Pennsylvania Water & Power Co., Holtwood, Pa., have organized two subsidiaries, the Safe Harbor Water Power Corporation and the Chanceford Water Power Corporation, to carry out a proposed hydroelectric power project on the Susquehanna River. A site will be taken over at a point about 10 miles from the present station of the parent company at McCalls Ferry (Holtwood); the project will include a power dam and installation of seven generating units to develop a capacity of about 200,000 hp. Provision will be made for the installation of additional generating machinery in the future. The project will include a steel tower transmission line and is reported to cost approximately \$30,000,000. It will require from 30 to 36 months for completion. The Consolidated Gas, Electric

Light & Power Co., Lexington Building, Baltimore, is interested in the project, and will receive a portion of its future power requirements from this source. J. E. Aldred is chairman of the board of both organizations.

Christian W. Lynch, Harrisburg, Pa., has acquired the plant and property of the Harrisburg Foundry & Machine Works, at a public sale for \$124,675, subject to a first mortgage of \$88,000. The plant has been operated for about a year past by a trustee in bankruptcy. The new owner is said to be planning a reorganization of the company and continued operation of the plant for the manufacture of stationary engines and other equipment.

The Norman P. Druck Motor Co., 636 East State Street, Trenton, N. J., will take bids at once on a general contract for a two-story automobile service, repair and garage building, to cost close to \$100,000 with equipment. J. Osborne Hunt, 219 East Hanover Street, is architect.

The Board of Education, Princeton, N. J., is considering the installation of manual training equipment in a new high school to cost \$500,000, for which it is proposed to ask bids on a general contract before the close of the month. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

The Board of Trustees, Haverford College, Haverford, Pa., has plans under way for a new three-story engineering laboratory, to cost about \$100,000 with equipment. Bids will soon be asked on a general contract. Mellor, Meigs & Howe, 205 South Juniper Street, Philadelphia, are architects.

The Red Lion Carton Co., Red Lion, Pa., manufacturer of corrugated and other cardboard boxes, etc., is said to be planning the installation of additional equipment for considerable increase in output. The company is now occupying a factory under lease and purposes to construct a new plant in the near future.

The Artesian Water Co., Richardson Park, Del., is disposing of a stock issue to total \$75,000, the proceeds to be used for extensions in pumping plant, system, etc., for services at Elsmere, Oak Grove, Roselle and vicinity, including installation of additional water tanks for storage service.

The Manley Mfg. Co., York, Pa., has taken over the automotive sales of the Ford Chain Block Co., Philadelphia, recently acquired by A. P. Van Schaick and W. M. Wheeler of the American Chain Co., Bridgeport, Conn. Under the new management the company will be prepared to furnish Ford chain hoists to the automotive as well as to the industrial trade.

The United Transit Safety Appliance Corporation, 524 Walnut Street, Philadelphia, has been organized to take over patents and to develop life saving appliances for interurban and street railroad cars, automobiles and buses. Manufacturing is still in the experimental stage and the corporation does not expect to be in the market for materials or equipment for about six months.

Chicago

CHICAGO, Oct. 17.

MACHINE tool business is spotty and the volume of sales so far in October does not clearly define the trend of the market. Several sizable industrial lists recently have been closed, and with those out of the way there is little left except scattered requirements of miscellaneous buyers. The railroads are practically out of the market. Requests for prices are not now always an indication of business in the near future, as many buyers are turning their attention to the preparation of budgets for 1928. New orders received the past week were mainly for replacements rather than additions to equipment. A battery manufacturer has purchased two 20-in. shapers. A statement issued by the Chicago school board indicates that the new Lane Technical High School will be constructed early next year.

Samuel Olson & Co., 2418 Bloomingdale Avenue, Chicago, manufacturers of conveying equipment, material-handling machinery, etc., are said to be planning the construction of a one and two-story addition to cost about \$70,000 with equipment.

The General Tire & Rubber Co., Akron, Ohio, has plans under way for a four-story factory branch and distributing branch at Cottage Grove Avenue and Twenty-third Street, Chicago, to cost \$250,000 with equipment. N. Max Dunning, 310 South Wabash Avenue, Chicago, is architect.

Ovens, power equipment, conveying and other machinery will be installed in the proposed two and four-story plant to be constructed at Minneapolis by the Zinsmaster Baking Co., Sherburne and Park Streets, St. Paul, Minn., to cost \$180,000 with machinery. Charles W. DeJarnett, Des Moines, Iowa, is architect.

The Crane Market

THERE is very little new inquiry for either overhead or locomotive cranes. The overhead crane and locomotive crane for the Erie Railroad shops at Hornell, N. Y., have not yet been closed and the locomotive cranes for the New York Central Railroad, which closed on two overhead cranes last week, have not yet been awarded. The International General Electric Co., is not in the market for a list of overhead cranes for export as was recently reported. The Phoenix Utility Co., 71 Broadway, New York, is understood to be preparing to close on a 75-ton overhead traveling crane. The Inland Steel Co., Indiana Harbor, Ind., which recently inquired for a used 5-ton overhead crane is in the market for another 5-ton, 47-ft. 11½-in. span crane, either new or used. A Connecticut quarry has closed on a 30-ton McMyler locomotive crane.

The Waterloo Airport Corporation, Waterloo, Iowa, has awarded a general contract to Mauser & Fell, 219 West Mullan Street, for a steel hangar, with machine shop and other buildings for airport service.

The Board of Trustees, Southern Illinois Teachers' College, Carbondale, Ill., has plans under way for a two-story science and manual arts building, to cost \$225,000 with mechanical equipment. W. J. Lindstrom, Department of Public Works and Buildings, State Capitol, Springfield, is architect.

The American Die Casting Co., Canton, Ill., is reported to be planning the construction of a one-story machine shop to cost about \$25,000 with equipment. It is proposed to proceed with the project early next year.

The Fiel Mfg. Co., 2450 West Forty-eighth Street, Chicago, manufacturer of mechanical equipment, has concluded negotiations for the purchase of the one-story plant of the American Foundry Equipment Co., on Forty-seventh Street, and will take immediate possession. The present business will be removed to the new location.

Charles Nord, 7855 Escanaba Avenue, Chicago, is at the head of a project to construct and operate a two-story automobile service, repair and garage building, to cost about \$135,000 with equipment.

The Williams-White Co., Third Avenue, Moline, Ill., manufacturer of pressing and bending machinery, pneumatic hammers, etc., has asked bids on a general contract for a one-story addition to be equipped primarily as a foundry, to cost \$75,000 with equipment. George Wheeler is company engineer.

The United Hardware Co., 637 West Roosevelt Boulevard, Chicago, has concluded negotiations for the purchase of the three-story and basement building at 527-29 Milwaukee Avenue, totaling about 16,000 sq. ft., and will occupy for a new storage and distributing plant.

The Auto Stove Works, Inc., New Athens, Ill., manufacturer of automobile heating equipment, etc., has asked bids on a general contract for a two-story addition, to cost \$80,000 with machinery. Gill & Jackson, 1328 Walnut Street, Murphysboro, Ill., are architects.

The Board of Education, Fosston, Minn., has plans for a one-story manual training shop at the local high school, and will take bids on a general contract at once. It is reported to cost about \$40,000 with equipment. Joseph B. DeRemer, Grand Forks, N. D., is architect.

The Commonwealth Edison Co., Chicago, will erect a one-story substation at 6139 Prairie Avenue to cost \$150,000.

The Capital City Ornamental Iron & Wire Works, St. Paul, Minn., has been organized to manufacture ornamental iron, bronze and wire work. It has a plant and all necessary machinery.

The E. A. Baumbach Mfg. Co., 1812 South Kilbourn Avenue, Chicago, manufacturer of die sets and accessories, has had plans drawn for a four-story building, which will provide 25,000 sq. ft. additional to its present plant. The estimated cost will be upward of \$75,000. C. H. Lenske is architect.

The Decatur Pump Co., Decatur, Ill., has purchased an 80 acre tract between Twelfth and Thirteenth Street, where it plans to erect a new factory in the fall of 1928. W. A. Shorb is president of the company.

Buffalo

BUFFALO, Oct. 17.

BIDS have been asked on a general contract by the Board of Education, Dunkirk, N. Y., for a new two-story vocational school, to cost \$50,000 with equipment. Oliver R. Johnson, Tenson Building, Jamestown, N. Y., is architect.

The Library Garage, Broadway, Buffalo, has begun superstructure for a seven-story addition to its service, repair and

Among recent purchases are:

Kenbar Construction Co., Hempstead, Long Island, N. Y., a 7½-ton crawl tread locomotive crane from the Browning Crane Co.

Passaic Consolidated Water Co., Paterson, N. J., a 5-ton truck crane from the Browning Crane Co.

New York Central Railroad, New York, two 50-ton overhead traveling cranes for Harmon, N. Y., from the Shaw Electric Crane Co.

United Engineering & Foundry Co., Pittsburgh, a 40-ton hot metal trolley with 10-ton auxiliary for its Tod works, Youngstown, from the Alliance Machine Co.

Chicago Zoological Society, Chicago, a 2-motor, monorail hoist from the Northern Engineering Works.

garage building, to cost in excess of \$175,000 with equipment. General contract has been let to James O. Cristina, Lackawanna Street, Buffalo.

The Buffalo, Niagara & Eastern Power Corporation, Buffalo, is arranging for an increase in preferred stock to total \$8,000,000, and increase in common stock of 525,000 shares, no par value, a portion of the proceeds to be used for extensions and improvements in power plants and transmission lines.

The L. C. Smith & Corona Typewriter Corporation East Washington Street, Syracuse, N. Y., manufacturer of typewriters and parts, has awarded a general contract to Dawson Brothers, Union Building, for a two-story addition, to cost about \$30,000. C. D. Corwin is company official in charge.

The Erie Railroad Co., Hornell, N. Y., is said to be planning the purchase of a traveling crane for installation at its local shops. The purchasing department is at 71 West Twenty-third Street, New York.

The Sodus Gas & Electric Light Co., Sodus, N. Y., has completed arrangements for a merger with the Lake Ontario Power Co., operating in this section, and will carry out an expansion program for increased power facilities, including transmission line construction. Other companies included in the consolidation are the Marion Power Co. and the Cayuga Light & Power Corporation, operating at Ithaca, N. Y., and vicinity.

New England

BOSTON, Oct. 17.

THE local machine tool market was inactive the past week and the several fairly important prospects with whom dealers have been negotiating apparently are no nearer closing than a fortnight ago. Backwardness in placing orders is attributed to lack of the anticipated demand for manufactured products. Several good inquiries have been received the past few days, including two or three lists, but details are withheld. New England machine tool builders are reported to have placed quite a little business the past fortnight, mostly in the Middle West.

Small tools continue to sell well, but machine shops are ordering conservatively.

Yale Kaplan, Bridgeport, Conn., has acquired the Colonial Brass Co., Plainville, Conn., and will manufacture automobile accessories.

The Thompson Wire Co., 41 Mildred Avenue, Dorchester district, Boston, has taken out a permit for alterations to its plant.

Stone & Webster, Inc., Boston, engineer, is supervising the erection of a \$200,000 boiler plant addition for the Hartford Electric Light Co., South Meadows, Conn. Miscellaneous equipment is required.

The Narragansett Electric Lighting Co., Turks Head building, Providence, R. I., contemplates the erection of a power plant at Bristol, R. I., for which a crane may be required. The architect has not been selected.

Isador Richmond, 48 Boylston Street, Boston, architect is taking bids on a one and two-story, 199 x 227 ft., addition to the plant of the Archer Strauss Rubber Co., Framingham, Mass. J. J. Sindler of the latter company is in charge of the project.

The Atlantic Mfg. Co., Milford, Conn., manufacturer of screw machine products, has awarded a general contract to the Hewlett Co., 886 Main Street, Bridgeport, Conn., for an addition, 40 x 63 ft., for which superstructure will begin at once.

The Remington Typewriter Co., 374 Broadway, New York, has awarded a general building contract to James Stewart & Co., Inc., 17 East Forty-second Street, for a four-story addition to its plant at Bridgeport, Conn., to cost about \$100,000 with equipment.

The New England Power Co., Worcester, Mass., is said to be considering the construction of a new hydroelectric generating plant on the Connecticut River, near Dalton, N. H., to cost upward of \$1,500,000 with transmission lines. Stone & Webster, Inc., 49 Federal Street, Boston, engineer, is understood to be interested in the project.

John Pinches & Sons, Inc., Berlin, Conn., manufacturer of general millwork, etc., has awarded a contract to William H. Allen & Co., Inc., New Britain, Conn., for a new one-story millwork and wood-working plant, 70 x 132 ft., with boiler house, etc., to cost about \$45,000 with equipment.

The Arrow-Hart & Hegeman Co., Inc., Hartford, Conn., has been formed under State laws, with capital of \$2,000,000, to take over and consolidate the Hart & Hegeman Mfg. Co., and the Arrow Electric Co., both operating local plants for the manufacture of electric switches, wiring devices, etc. Both plants will be continued in operation under a central management. Edward R. Grier, heretofore vice-president and general manager of the Arrow organization, will be president of the consolidated company.

Robert J. Gauvreau & Co., Inc., 11 Beacon Street, Boston, contractor, has filed plans for a one-story automobile service, repair and garage building, 180 x 280 ft., at 1322 Tremont Street, Roxbury, Boston, to cost about \$100,000 with equipment.

E. I. du Pont de Nemours & Co., Fabrikoid Division, Fairfield, Conn., have plans for a one-story addition to the machine shop at the local mill, in connection with an expansion program. Headquarters are at Wilmington, Del.

The Twin State Gas & Electric Co., Brattleboro, Vt., will rebuild a portion of its power plant at Canaan, N. H., with installation of additional equipment. The company has approved plans for a new transmission line from Lancaster to Colebrook, N. H., about 40 miles.

The Commodore Engine Co., Inc., 51 Fleet Street, Brooklyn, manufacturer of gasoline engine equipment, is planning the establishment of a new plant at Hartford, Conn., and has requested the Chamber of Commerce of that city to locate a suitable factory which can be secured under lease or purchase. Consideration will be given to a structure partially equipped.

The Pratt & Whitney Aircraft Corporation, Hartford, Conn., is planning the construction of a hangar with repair and operating facilities at the local municipal Brainard Aviation Field, to cost close to \$70,000, with equipment.

Pittsburgh

PITTSBURGH, Oct. 17.

MACHINE tool business still is very slow. No lists have reached the trade and while there is a fairly well sustained flow of single orders, dealers are not satisfied either with the total sales or profits. General conditions are so quiet in this district that the trade is not very hopeful as to business over the remainder of the year.

Contract has been let by the Mesta Machine Co., West Homestead, Pittsburgh, manufacturer of hydraulic and other presses, heavy machinery, parts, etc., to the Austin Co., for a one-story addition, 80 x 400 ft., to cost approximately \$90,000 with equipment.

A. E. Sloan, Berger Building, Pittsburgh, attorney, acting for local industrial interests, names temporarily withheld, has acquired at public auction the property of the Marshall Foundry Co., 220 x 475 ft., at Twenty-sixth Street and the Allegheny Valley Railroad, for \$100,300. A former bid at recent sale by the same interests of \$90,000 was rejected.

R. K. Russell, Warren, Pa., has plans for a three-story automobile service, repair and garage building, 100 x 100 ft., to cost about \$100,000 including equipment. It will be used for the Buick automobile.

The Chicago Pneumatic Tool Co., Franklin, Pa., has arranged for a bond issue of \$3,000,000, a portion of the fund to be used for expansion. Work is in progress on an addition to the local plant, consisting of three one-story units to cost approximately \$500,000 with machinery. Headquarters are at 6 East Forty-fourth Street, New York.

The Winifrede Block Coal Co., Nolan, W. Va., E. C. Lambert, in charge, is planning the purchase of a bucket conveyor of about 3-tons capacity, with cable, etc., complete, for transporting coal from company mines to the tipples.

The Hachmister-Lind Chemical Co., McKees Rocks, Pa., has awarded a general contract to E. H. Dobson, Avalon,

Pa., for a new three-story and basement plant, 110 x 121 ft., for the manufacture of industrial chemicals, to cost close to \$65,000 with equipment.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for an arbor press, about 30-ton capacity; a lifting magnet, to operate at 220 volts, d.c.; a jappanning oven, and industrial motors, from 5 to 50-hp.

Milwaukee

MILWAUKEE, Oct. 17.

SALES of machine tools during the first half of October show improvement over the same period of the previous month, due doubtless to the stimulus of the Cleveland exposition. Demand is moderately active, but mainly for single items, and comes from a wide variety of sources. Inquiry from automotive shops is improving, but purchases from this quarter are still limited to actual necessities. Foundry and machine shop operations are gaining new business, and the general situation with respect to prospective tool sales is regarded as more favorable than for several months.

The J. I. Case Threshing Machine Co., Racine, Wis., is making improvements in its plant which will cost about \$200,000 and includes the purchase of considerable additional equipment. The boiler shop, where steam engine tractors formerly were built, and more recently used for miscellaneous work, will be rearranged for more economical manufacture of wheels for gas tractors, threshing machines, etc. In the foundry the milling and cleaning machinery is being moved for improved handling and cleaning of castings and the old core ovens are being dismantled. The present cleaning room will be converted into a core room with new oven equipment. A new concrete floor will be laid in the foundry. The sand storage capacity is being increased.

The Invincible Metal Furniture Co., Manitowoc, Wis., has increased its capital stock from \$200,000 to \$300,000 in contemplation of the erection of an addition to the plant early next spring. A new shop extension was completed several months ago, but further enlargement is now becoming necessary.

The Nash Motors Co., Kenosha, Wis., has placed the general contract with Nelson & Co., Racine, Wis., for the construction of a new heat treating building, 90 x 170 ft., and an additional storage building, 40 x 100 ft., at the Racine factory. D. W. Averill is general manager of the Racine division.

The Universal Motor Co., Oshkosh, Wis., expects to take occupancy of its new plant on Nov. 1 and is making inquiry for additional miscellaneous equipment for manufacturing marine engines, industrial motors, engine-driven pumping units, etc. The new plant is 152 x 378 ft. and will cost approximately \$125,000 with equipment.

The Village Board, Osseo, Wis., was authorized at a special election to issue additional bonds of \$25,000 to complete a \$100,000 waterworks and sewage project by the purchase and installation of pumping equipment, motors, etc. The work is in charge of Druar & Milinowski, consulting engineers, Minneapolis, Minn. J. W. Smith is village clerk.

The Fred Pabst Co., 917 Juneau Avenue, Milwaukee, has purchased the plant of the Fitzsimmons Steel Products Co., 532-548 Park Street, for a price close to \$100,000 and will use the shop for manufacturing nipple fittings, cutting pipe, etc. The building has an area of 40,000 sq. ft., on a site 200 x 275 ft.

The Dolomite Co., Cleveland, has purchased the entire business of the Leatham D. Smith Stone Co., Sturgeon Bay, Wis., for \$675,000 and after taking possession Jan. 1 will invest \$200,000 additional in enlarging the quarries, crushing and handling plant.

The Manitowoc Seating Corporation has been organized at Manitowoc, Wis., with a capital stock of \$250,000 to manufacture church and lodge furniture and fixtures and other hardwood products. The principals are former department heads of the Manitowoc branch works of the American Seating Co., which recently consolidated the operation with its works at Grand Rapids, Mich. John G. Johnson, Anton W. Sporer and Henry Dumdey are the incorporators.

The Modern Auto Radiator Co., Milwaukee, has been incorporated with \$15,000 capital stock to manufacture automobile radiators and sheet metal stampings, and conduct a general repair and replacement business. The principals are Meyer Lubotzky, 384 Twelfth Street; Morris Wald and Philip Schneider.

The Schlueter Boiler Works, 320 North Main Street, Janesville, Wis., has placed contracts for the construction of a two-story addition, 66 x 86 ft., to provide more space

for boiler fabrication and a new cutting and welding shop. The architect is F. E. Sadler, Janesville.

The Common Council, West Bend, Wis., expects to take bids soon for the pumping equipment and a 50 or 75-hp. motor with automatic control for a new artesian well to be completed about Nov. 1. A river crossing of 1000 ft. of 10-in. class C pipe also will be constructed. P. L. Clark, Appleton, Wis., is consulting engineer. C. P. Heipp is city clerk.

The Special Stamping & Mfg. Co., 1710 St. Paul Avenue, Milwaukee, has increased its capital stock from \$60,000 to \$100,000 with a view of an early extension of its plant.

The Vincent-McCall Co., Kenosha, Wis., manufacturer of automobile body, chair and bed springs, has started work on the erection of a two-story factory extension, 25 x 200 ft.

The R. L. Billingsley Co., Minneapolis, Minn., is low bidder at \$360,353 for the general work on the new senior high and vocational school and gymnasium building at Neenah, Wis., which will cost about \$500,000 complete. Plans are by John D. Chubb, architect, Chicago.

The Chain Belt Co., Milwaukee, has acquired the mortar and plaster mixer business of the Atlas Engineering Co., 3038 Galena Street, Milwaukee, and is consolidating the operation with its concrete mixer business, thereby rounding out its line of this class of contractors' equipment. Besides the Atlas company and the Stearns Conveyor Co., Cleveland, acquired within the past year, the Federal Malleable Co., Sivyer Steel Casting Co., and Interstate Drop Forge Co., Milwaukee, and the Nugent Steel Casting Co., Chicago, are affiliated with the Chain Belt Co.

George M. Pendergast & Co., Milwaukee, specializing in foundry sands, refractories, clays, etc., have moved to larger quarters at 154-156 Clinton Street. The company features Blue Ribbon brands of sand. The Milwaukee Pattern Supply Co., Adolph Bues, manager, handling pattern-makers' supplies, aluminum, etc., is now occupying space in the same building with the Pendergast company.

St. Louis

ST. LOUIS, Oct. 17.

BIDS will be received by the Board of Public Service, St. Louis, until Nov. 1 for electrically and hand-operated gate valves for the municipal waterworks at Howard Bend, Hine, Mo., to cost \$86,000. Leonard A. Day is water commissioner.

The Polar Wave Ice & Fuel Co., 3638 Olive Street, St. Louis, is said to be planning the early rebuilding of three of its ice-manufacturing plants, recently partially destroyed by a tornado. J. C. Muckerman is vice-president and general manager.

The Cessna-Roos Aircraft Co., Wichita, Kan., will soon begin the construction of a new local plant, including parts production and assembling, estimated to cost about \$38,000 with equipment.

The Chouteau Avenue Auto & Wagon Co., 2118 Chouteau Avenue, St. Louis, manufacturer of automobile and wagon bodies, etc., will proceed with erection by day labor for a one-story addition, 60 x 100 ft., to cost close to \$35,000 with equipment. Jacob Heim, Holland Building, is architect.

The General Electric Co., Schenectady, N. Y., has negotiations under way with the City Council, St. Louis, for the closing of a number of streets in the vicinity of Goodfellow Avenue and Bircher Street, to provide site for a new branch plant, reported to cost more than \$10,000,000 with machinery. The project will be handled by the engineering department of the company at Schenectady.

The Kansas City Power & Light Co., Kansas City, Mo., has arranged for a preferred stock issue to total \$2,090,000, a portion of the fund to be used for extensions and improvements in generating plants and system. The company has recently approved plans for additions in its North East generating plant to include the installation of considerable new machinery, and will also increase the capacity of its Grand Avenue electric power plant.

The Robertson Aircraft Corporation, St. Louis, care of Curtis O. Robertson, St. Louis, president, has tentative plans for a new one-story plant at Bridgeton, Mo., to cost about \$40,000 with equipment.

The Lion Oil Refining Co., El Dorado, Ark., plans to rebuild the portion of its local oil refinery destroyed by fire Oct. 9, with loss reported at close to \$100,000 including equipment.

The Shawnee Ice Co., Wewoka, Okla., will erect a one-story addition to its ice-manufacturing plant to cost \$80,000 with machinery. E. W. Hill is president.

The City Council, Lamar, Mo., has plans for a one-story municipal electric light and power plant, to cost about \$45,000 with equipment. A. C. Moore, Joplin National Bank Building, Joplin, Mo., is architect.

The P. F. Connelly Paving Co., Southern Trust Building, Little Rock, Ark., is planning the purchase of a press for the production of asphalt blocks and is desirous of getting in touch with manufacturers of such equipment.

The St. Louis Heating Co., 2901 Elliott Street, St. Louis, manufacturer of heating equipment, contemplates rebuilding the portion of its plant recently destroyed by tornado.

The Peake Auto Supply Co., Sixteenth and Oak Streets, Kansas City, Mo., has plans for a three-story and basement addition to its service and repair building, 75 x 95 ft., to cost about \$75,000 with equipment.

Cleveland

CLEVELAND, Oct. 17.

THE machine tool market shows a little more life than recently. Sales gained the past week and inquiry is slightly more plentiful. Purchases for the most part are still confined to single machines, although a few orders were placed during the week for lots of two or three. Virtually no business is coming from the automotive industry. Some scattering orders are being placed in Detroit by plants outside of the automotive field.

Wood-working machinery is fairly active. The Celina Maid Furniture Co., Celina, Ohio, purchased 40 to 50 wood-working tools during the week and a larger lot is pending from another furniture plant.

The Champion Machine & Forging Co., 3635 East Seventy-eighth Street, Cleveland, has asked bids on a general contract for a one-story addition for expansion in the drop forge department to cost upward of \$40,000. Ernest McGeorge, 3030 Euclid Avenue, is engineer.

The Brandt Brothers Furniture Mfg. Co., Celina, Ohio, has acquired property at Delphos, Ohio, as a site for a new factory to replace its Celina plant recently destroyed by fire, and which will not be rebuilt at that place. The new plant will be of multi-story type and will cost more than \$250,000 with machinery.

The Atlas Car & Mfg. Co., 1100 Ivanhoe Road, Cleveland, manufacturer of electric locomotives, electric trucks, etc., has awarded a general contract to the Industrial Construction Co., 308 Euclid Avenue, for a one-story and basement addition, 60 x 125 ft., to cost close to \$50,000 with equipment.

The Container Co., 2604 Albion Street, Toledo, Ohio, manufacturer of corrugated paper boxes, containers, etc., is considering the erection of a new plant at Van Wert, Ohio, to cost more than \$40,000 with equipment. A. H. Miller is secretary.

The Mogadore Insulator Co., Mogadore, Ohio, manufacturer of electric insulators, has plans for a two-story addition, 100 x 200 ft., to cost close to \$90,000 with equipment.

Following the completion of the first unit of its new plant in the East End section, the Patterson Foundry & Machine Co., East Liverpool, Ohio, manufacturer of castings, clay-working machinery, etc., plans the erection of two additional units in the near future, to total about 50,000 sq. ft. of floor space, reported to cost more than \$100,000 with equipment.

Cincinnati

CINCINNATI, Oct. 17.

CONDITIONS in the machine tool market are spotty, some builders reporting a fair amount of business being placed and others stating that sales have been poor. Total orders, however, are probably from 10 to 15 per cent better than in the forepart of September and indications are that this margin will be maintained during the remainder of the month. The number of inquiries is a source of encouragement. Many buyers have formulated programs which call for the purchase of considerable new equipment, but have postponed definite action until the general industrial situation is more favorable.

An automobile manufacturer in the Detroit district has bought eight large lathes from a local company, while the United States Shipping Board is expected to close for seven engine lathes for Pacific Coast delivery. Other sales the past week include a 62-in. heavy boring mill to the A. O. Smith Corporation, Milwaukee, and a 100-ton bushing press to the New York Central Railroad.

The G. W. Shroyer Co., North Main Street, Dayton, Ohio, representative for the Cadillac and La Salle automobiles,

has awarded a general contract to the Alfred W. Kimmel Contracting Co., Mutual Home Building, for its three-story service, repair and garage building, 100 x 120 ft., to cost close to \$150,000 with equipment. Herman & Bedner, Dayton, are architects.

Ovens, power equipment and other machinery will be installed in the proposed addition to the plant of Earl Dickson, 371 East Fifth Street, Chillicothe, Ohio, to cost approximately \$100,000. Bids will be asked near the close of the month. The W. E. Long Co., 155 North Clark Street, Chicago, is architect.

The Sunlight Mining Co., Madisonville, Ky., is said to be planning to rebuild its tippie, shop and coal washery, about three miles from the city, recently destroyed by fire, with loss reported upward of \$115,000 including equipment.

The L. J. Breed Equipment Co., James Building, Chattanooga, Tenn., machinery dealer, has inquiries out for a drill sharpener, Ingersoll-Rand type No. 50, with accessories.

The Condon Engineering Co., 231 South La Salle Street, Chicago, is in charge of a proposed power plant project at Sebree, Ky., consisting of a main central station with transmission lines, to cost more than \$175,000 including equipment. It is purposed to ask bids on general contract early in January.

The Braun Brothers Packing Co., Troy, Ohio, will build a two-story cold storage and refrigerating plant, 48 x 108 ft., in connection with a new packing house addition. The entire project will cost close to \$65,000 with equipment. Lloyd Zeller, Tecumseh Building, Springfield, Ohio, is architect and engineer.

The Graybar Electric Co., 401 Hudson Street, New York, electrical equipment and supplies, has leased a one-story and basement building, 75 x 160 ft., to be erected on Second Street, Memphis, Tenn., for a new storage and distributing branch. It will cost about \$45,000 with equipment. Joe T. Wallace, Bank of Commerce Building, Memphis, is architect.

The National Steel Stamping Corporation, East Main Street, Morristown, Tenn., recently formed with a capital of \$50,000, is said to be arranging for the establishment of a local plant for the manufacture of steel ends for school desks, and kindred stamped steel specialties, with initial unit to cost close to \$35,000 with equipment.

The Board of Education, Goodwyn Institute Building, Memphis, Tenn., will soon ask bids on a general contract for a three-story and basement technical high school, with two-story vocational shop on adjoining site. The entire project will cost about \$450,000 with equipment. Joe T. Wallace, Bank of Commerce Building, is architect.

Detroit

DETROIT, Oct. 17.

THE Dowagiac Steel Furnace Co., Dowagiac, Mich., is establishing a new local plant to replace a works formerly operated at Hoopeston, Ill., and expects to have the unit ready for service early next month.

The United States Gypsum Co., 205 West Monroe Street, Chicago, manufacturer of tile, blocks and other building products, is said to have preliminary plans for a new mill on the River Rouge, near Dearborn, Mich., to cost upward of \$200,000 with machinery. It is purposed to begin work early next year. C. R. Birdsley is company engineer.

Bakers' Furniture Factories, Inc., Allegan, Mich., will soon begin superstructure for a three-story addition to cost approximately \$70,000 with equipment. Colton & Knecht, Grand Rapids, Mich., are architects.

The Baldwin Rubber Co., Pontiac, Mich., has awarded a general contract to the Pryale Construction Co., Pontiac, for two new plant units to cost about \$200,000 with equipment.

The Board of Education, Oxford, Mich., is said to be planning the installation of manual training equipment in a new two-story high school to cost about \$175,000, for which plans will be drawn by Cowles & Mutscheller, 114 North Washington Street, Saginaw, Mich., architects.

The Sanitarium Hospital Equipment Co., Battle Creek, Mich., manufacturer of metal furniture, has awarded a general contract to F. J. Skidmore, Battle Creek, for a two-story and basement addition, 80 x 150 ft., to cost in excess of \$100,000 with equipment. M. J. Morehouse, 343 South Dearborn Street, Chicago, is architect.

The Board of Public Works, Lansing, Mich., is planning the installation of a mechanical water softening plant for the municipal water system, to cost \$480,000 with machinery. A bond issue in this amount will be placed before voters at the general election for ratification.

The Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, welding apparatus, etc., a subsidiary of the National Carbide & Carbon Co., is reported to be arranging for the erection

of a new plant at Grand Rapids, Mich., to cost more than \$60,000 with equipment.

The Anchor Bay Oil Co., and the St. Clair Oil & Gas Co., Mount Clemens, Mich., have arranged for a merger and will carry out an expansion program. It is proposed to dispose of a new stock issue of \$73,000, a considerable portion of the fund to be used for extensions, and the installation of additional well-drilling equipment.

Fire, Oct. 10, destroyed a portion of the machine shops and other buildings at the State prison, Jackson, Mich., with loss reported at \$35,000 including equipment. The State Prison Board, Lansing, is considering rebuilding.

The Sewell Cushion Wheel Mfg. Co., Detroit, has been incorporated by John H. Hammes, vice-president of the Sewell Cushion Wheel Co., and will manufacture the original Sewell cushion truck wheel and standard wheels for trucks or fire apparatus. The original Sewell Cushion Wheel Co. is now manufacturing steering wheels. The new company has leased a building at 4001 Beaufait Street and will give service on all Sewell cushion wheels.

South Atlantic States

BALTIMORE, Oct. 17.

CONTRACT has been let by the Holtite Mfg. Co., Warner and Ostend Streets, Baltimore, manufacturer of rubber specialties, to the Reliable Construction Co., local, for a one-story addition, to cost about \$35,000 with equipment. Stanislaus Russell, 11 East Lexington Street, is architect.

The Eastern Welding & Radiator Co., 417 South Fifth Street, Baltimore, has awarded a contract to Lewis A. Young, 10 Glen Avenue, for a one-story addition, 35 x 115 ft., to cost about \$25,000 with equipment.

The Farmers' Salvage Co., Bennettsville, S. C., recently formed by C. S. McCall, Bennettsville, and associates, is planning the early establishment of a factory for rebuilding and repairing farming and agricultural machinery and implements. It is also proposed to establish branch plants in North and South Carolina.

Union Brothers, 37-41 West Cross Street, Baltimore, manufacturers of furniture, are completing plans for a new three-story plant, to cost close to \$70,000 with machinery. Benjamin Frank, 517 North Charles Street, is architect.

The Bergen & Peck Co., P. O. Box 917, Savannah, Ga., is planning the early purchase of an ammonia compressor, vertical type, belt-driven.

The Columbus Fender & Body Works, Columbus, Ga., manufacturer of automobile bodies, fenders, etc., is planning the early erection of a one-story addition, 60 x 150 ft., to cost about \$23,000 with equipment.

H. C. Powell and L. B. Gaskins, Nashville, Ga., are at the head of a project to construct and operate a local plant for the manufacture of spraying machines and parts. A site has been acquired and work will soon begin. The initial plant will cost about \$25,000 with equipment. A company with capital of \$100,000 will be organized to carry out the enterprise.

The Pine Hall Brick & Pipe Co., Pine Hall, N. C., has plans for a new local plant for the manufacture of vitrified sewer pipe, with main unit totaling about 75,000 sq. ft. of floor space. It will cost upward of \$200,000 with machinery and is scheduled to be ready for service early in the spring. C. L. Lester is vice-president, and E. R. Rankin, secretary and treasurer.

The Standard Oil Co., Orangeburg, S. C., is planning the construction of a new storage and distributing plant on local site, to cost close to \$30,000 with equipment.

The Georgia-Carolina Service Co., Seneca, S. C., is said to be planning the construction of a new ice-manufacturing plant, to cost about \$45,000 with machinery.

The Safety Celluloid Co., Amcelle, near Cumberland, Md., a subsidiary of the Celanese Corporation of America, Inc., Amcelle, has broken ground for a new plant to manufacture celluloid acetate and affiliated products, to cost close to \$2,000,000 with machinery. It will include a machine shop and other mechanical departments. The company was recently consolidated with the Celluloid Co., Newark, N. J. F. T. Small is engineer for the parent company, and has supervised plans for the new mill.

The Hackley Morrison Co., Inc., 204 North Jefferson Street, Richmond, Va., machinery dealer, has inquiries out for a jack hammer drill, 70-lb. capacity.

The Oakridge Paradise Mills, Belona, Va., are planning the purchase of a water wheel, 20 ft. diameter, 3 to 4-ft. face, for power service at its plant.

Levenson & Zenitz, Howard and Ostend Streets, Baltimore, manufacturers of furniture, have plans in progress for a two-story factory addition, to cost close to \$75,000 with equipment. John R. Freund, 1307 St. Paul Street, is architect.

The Guyandotte Coal & Coke Holding Corporation, Bankers' Trust Building, Norfolk, Va., is planning the purchase of coal pulverizing machinery.

Gulf States

BIRMINGHAM, Oct. 17.

PLANS are being completed by the Southern Ornamental Iron Works, Inc., Harwood and Coombs Streets, Dallas, Tex., for a proposed one-story plant at Arlington, Tex., to be 100 x 250 ft., for the production of ornamental iron elevator doors, grills, etc., to cost about \$60,000 with equipment.

The United States Engineer, Trust Co. Building, Galveston, Tex., is asking bids until Nov. 7 for one vertical propelling engine of full Diesel type, with accessories.

The Alabama, Tennessee & Northern Railroad Corporation, Mobile, Ala., has taken over a tract of about 16 acres for a new terminal, including engine house with repair facilities; freight terminal buildings, with mechanical handling equipment, including elevating and conveying machinery, and other structures, reported to cost about \$200,000 with equipment. W. Toxey is chief engineer for the road.

The Moss Battery & Electric Co., Clarendon, Tex., has inquiries out for an air compressor for installation at its plant; also air stand jacks, battery charger and other equipment.

The Central Power & Light Co., First National Bank Building, San Antonio, Tex., is said to be planning the early construction of a new one-story ice-manufacturing and cold storage plant at Alamo, Tex., to cost close to \$50,000 with equipment; also for a similar plant at Brownsville, Tex., to cost about \$45,000, and at Donna, Tex., to cost approximately \$40,000 including equipment. The company is concluding negotiations for the purchase of the municipal electric light and power plant and waterworks at Harlingen, Tex., and plans expansion in this section, including transmission line construction.

A. A. Berger & Co., Inc., 316 Preston Avenue, Houston, Tex., manufacturer of iron products, wire goods, etc., is said to be contemplating extensions in its plant and installation of additional equipment. The company has recently arranged for an increase in capital to \$30,000 for expansion.

The Phillips Petroleum Co., Bartlesville, Okla., has authorized plans for a new oil refinery at Borger, Tex., in the Panhandle oilfields, to cost in excess of \$175,000 with machinery.

The Robinson Brothers Motor Co., East Capitol Street, Jackson, Miss., is completing plans for a two-story service, repair and garage building, 85 x 150 ft., to cost about \$85,000 with equipment. E. G. Hull, Merchants' Bank Building, is architect.

The Southern Iron & Machine Co., 382 North Bowie Street, San Benito, Tex., manufacturer of irrigation gates and kindred heavy iron castings and equipment, has acquired a new building and will remodel for expansion. The installation is estimated to cost in excess of \$20,000.

The Texas Gulf Power Co., Texas City, Tex., is said to have plans under way for a new steam-operated electric power house, to cost in excess of \$200,000 with machinery.

The McWane Cast Iron Pipe Co., 3700 North Eleventh Street, Birmingham, has filed plans for a one-story foundry addition, 28 x 160 ft.

The Victoria Planing Mill, Victoria, Tex., is completing plans for a new one-story mill, 60 x 100 ft., to cost close to \$50,000 with equipment.

The Acme Wire & Iron Works, Inc., 1601 North Laredo Street, San Antonio, Tex., has plans for a one-story addition, 60 x 93 ft., and will soon begin superstructure. Adams & Adams, Builders' Exchange Building, are architects.

Hudson & Mims, Monroeville, Ala., are considering the erection of a new ice-manufacturing and cold storage plant at Pensacola, Fla., to cost close to \$100,000 including machinery.

The Texas & Pacific Railroad Co., Texas & Pacific Building, Dallas, Tex., has begun an expansion and improvement program at its car and locomotive repair shops at Sherman, Tex., to cost close to \$100,000 with equipment. E. F. Mitchell is chief engineer.

The Hassan Realty Co., Meridian, Miss., has filed plans for the construction of a new cold storage and refrigerating plant to cost approximately \$30,000 with equipment.

The Caddo Parish School Board, Shreveport, La., plans the installation of manual training equipment in a proposed two-story junior high school to cost \$400,000, for which plans are being completed by Edward F. Neild, City Bank Building, architect.

The American Metals Co., Blackwell, Okla., is said to have completed arrangements for the purchase of property at Dalhart, Tex., for the establishment of a new plant.

It is proposed to remove the present business to the new location and install additional equipment.

The Crystal Creamery Co., 300 East Magnolia Street, Fort Worth, Tex., is planning the early purchase of refrigerating machinery for installation in a new plant; ice cream freezers also will be purchased. Web Maddox is manager.

Indiana

INDIANAPOLIS, Oct. 17.

THE Perfect Circle Co., Newcastle, Ind., manufacturer of piston rings, etc., with headquarters at Hagerstown, Md., has taken title to the local four-story plant of the Lomar Armored Tire Co., occupied for about a year and a half under lease. The company plans expansion, to include an extension on Walnut Street, and the installation of new foundry equipment, electric furnace apparatus and other equipment.

Ovens, power equipment, conveying and other machinery will be installed in the proposed plant to be erected at Louisville by the Donaldson Baking Co., Indianapolis, Fred E. Allen, 4016 Carrollton Street, president, to cost upward of \$175,000.

The Maring Wire Co., Muskegon, Mich., is pushing construction on a new mill at Anderson, Ind., for the production of copper wire, and it is purposed to have the plant ready for service early in December. It will cost in excess of \$85,000 and will be operated as a branch.

The Board of Education, Hobart, Ind., is said to be considering the installation of manual training equipment in the proposed two-story high school on the Country Club Estate lands, to cost more than \$175,000 with equipment. Wainwright, Vaughn & Co., First Trust Building, Hammond, Ind., are architects.

The J. R. Grantham Motor Sales Co., 541 Washington Street, Gary, Ind., will soon begin the erection of a new three-story service, repair and garage building, to cost about \$110,000 with equipment. J. H. Wildermuth, 583 Broadway, is architect.

The M. B. Skinner Co., 562 Washington Boulevard, Chicago, manufacturer of steam specialties, etc., is said to be planning the early erection of a new one-story plant at South Bend, Ind., to cost in excess of \$80,000 with equipment.

The Southern Indiana Light & Power Co., Evansville, Ind., is arranging for the purchase of the plant and properties of the Trafalgar Light & Power Co., operating in the vicinity of Columbus, Ind., for \$115,000, and plans expansion in that section, including transmission line construction.

The Dos Mfg. Co., Fortville, Ind., has been organized to manufacture tools and dies and other light manufacturing. The company has its own building for general use and is in operation. Charles Sparks is president of the organization.

Pacific Coast

SAN FRANCISCO, Oct. 12.

THE Hurley Machine Co., 600 West Jackson Boulevard, Chicago, manufacturer of vacuum cleaning machines and parts, electric washing machines, etc., has acquired property at Los Angeles for a Pacific Coast assembling plant and will have plans drawn soon for initial units. It is reported to cost close to \$100,000 with equipment. Local offices of the company are at 1017 South Grand Avenue.

The Public Utilities Consolidated Corporation, Kingman, Ariz., has arranged for a bond issue of \$1,250,000, a portion of the proceeds to be used for extensions and improvements in power plants and system, and the acquisition of new properties in the State. The company is operated under the direction of the W. B. Foshay Co., Minneapolis, Minn.

The Pacific Coast Steel Products Co., Los Angeles, has plans under way for new branch works at Phoenix, Ariz., for the production of steel wire products and affiliated specialties. The main unit will be one story and basement, 70 x 120 ft. The project will cost in excess of \$75,000 with equipment. J. E. Lonngren, Phoenix, is in charge.

The Pacific Can Co., 200 Division Street, San Francisco, will soon begin the erection of a one-story plant to cost more than \$250,000 with equipment. L. H. Nishkian, Monadnock Building, is engineer.

The Amalgamated Sugar Co., Ogden, Utah, is reported to be planning the construction of a new beet sugar refinery at Missoula, Mont., including machine shop and other mechanical departments, to cost more than \$750,000 with equipment.

The Fellman Furniture Mfg. Co., Astoria, Ore., contemplates the erection of a new plant to cost in excess of \$50,000 with equipment.

The Board of County Supervisors, Bakersfield, Cal., is having plans drawn for a group of buildings at the County

airport, including two hangars, machine shop and administration building, to cost about \$45,000 with equipment. Charles H. Biggar, Bakersfield, is architect.

The Egyptian Lacquer Mfg. Co., Los Angeles, has awarded a general contract to Houghton & Anderson, 143 Rose Street, for a one-story and basement addition to cost approximately \$40,000. Mott M. Marston, Douglas Building, is architect.

The Los Angeles Railway Co., Los Angeles Railway Building, Los Angeles, has plans for a new one-story automatic power substation at Inglewood, to cost about \$50,000 with equipment. The company engineering department is in charge.

The City Council, Beaver City, Utah, will erect an addition to the municipal electric light and power plant, to cost \$30,000 with equipment. Caldwell & Richards, Salt Lake City, are consulting engineers.

The Ryan Aeronautical Corporation is preparing plans for a \$250,000 plant for building and distributing Ryan-Siesmen air-cooled airplane engines. T. Claude Ryan is president.

The Adams Pipe Works, 2025 Bay Street, Los Angeles, is taking bids for a factory building, 40 x 177 ft.

Canada

TORONTO, Oct. 17.

MACHINE tool and machinery sales are increasing in this market. Builders and dealers report a good demand for various lines, with a stronger showing in fair sized lists, in addition to more orders for one or two tools for replacement. Canada has experienced considerable improvement in industrial activities this year and many companies with new plants or additions under construction are now showing interest in equipment with the intention of making purchases. Both the Canadian National and Canadian Pacific Railroads have been buying for shop replacements and the proposed improvements to car shops and repair works of the Canadian National Railways are expected to result in extensive purchases. Small tools are moving more freely.

The Miner Rubber Co., Granby, Que., is having plans prepared by J. Drummond & J. Maton, for a two and one-half story, 60 x 120 ft., factory to cost \$100,000. Construction work will start next spring. The company is now building a \$30,000 addition to its factory.

The National Table Co., Third Avenue East, Owen Sound, Ont., has started work on a three-story, 50 x 60 ft., addition to its factory. Wood-working machinery and tools will be purchased.

W. D. Beath & Son, Ltd., 394 Symmington Avenue, Toronto, manufacturer of electric hoists, merchandise carriers, steel drums, etc., has let a number of contracts in connection with proposed addition.

Work has been started on an addition and repairs to municipal power plant at Parry Sound, Ont., to cost \$100,000.

The Canadian National Railways propose to start work soon on improvements and extensions to its yards at Niagara Falls, Ont. Included in the program is the erection of car repair shops, the installation of new switches and the remodeling of station.

The International Fibre Co., which operates a plant at Midland, Ont., will erect a plant at Ottawa, Ont. The proposed buildings will cost approximately \$250,000 and will be of reinforced concrete construction. Tenders are being called.

The Renfrew Refrigerator Co., Ltd., Renfrew, Ont., will build an addition to its plant to cost between \$25,000 and \$35,000, the greater part of the proposed expenditure to go into the purchase of machinery and tools. The company is now in the market for equipment required. Construction will start immediately, according to Thomas A. Low, president of the company. F. D. Vickers is manager.

Contract for the foundation work in connection with locomotive erection and machine shops at Point St. Charles, Montreal Terminals, for the Canadian National Railways, has been awarded to A. F. Byers & Co., Ltd., Montreal. T. T. Irving, Canadian National Railways, New Union Station, Toronto, is regional chief engineer. Other contracts are expected to be awarded soon.

The Bedford Machine Co., 186 Bedford Road, Toronto, proposes to start work soon on a one-story addition 55 x 80 ft. New equipment will be required.

Construction work on the hydroelectric power development plant for the Montreal Island Power Co., at Back River, Montreal, will be started soon. Contract for the construction of the railroad necessary for the undertaking, has been awarded to the Foundation Co. of Canada, Ltd. Final details of the engineering department's specifications

are now in the hands of tendering firms, which have to be returned in a few days. Tenders for 48,000-hp. turbines will be submitted within the next few days for units of either six 8000 hp., or four of 12,000 hp.

The International Harvester Co. of Canada, Ltd., 5267 DeGaspe Street, Montreal, will purchase tools and equipment for a two-story, 110 x 150 ft. addition to a repair plant and service station.

S. Schenkman, 5056 Sherbrooke Street West, Montreal, is asking for equipment for an automobile repair shop, service station and garage.

N. F. Beach Co., Winchester, Ont., will purchase equipment for a furniture factory to replace one recently destroyed by fire with a loss of \$200,000.

The Great Northern Utilities Co., 3933 Drexel Boulevard, Chicago, will build a gas plant at Levis, Que., to cost \$500,000 for the municipal councils of Levis and Lauzon, Que.

Contractors have been invited to submit tenders in connection with \$100,000 additions to the plant of the Willys-Overland, Ltd., Weston Road, Toronto. The building to be one story, 67 x 260 ft., of reinforced concrete and brick construction. This will be the first story of a proposed four-story addition to the plant. Harkness, Loudon & Hertzberg, Toronto, are engineers.

The Standard Steel Construction Co., 55 Main Street East, Welland, Ont., has been awarded the steel contract for buildings Nos. 3 and 4 for the \$400,000 coke plant to be erected for the Hamilton By-Products Coke Ovens, Ltd., Hamilton, Ont. The Semet-Solvay Engineering Co., 40 Rector Street, New York, is the general contractor.

H. T. Hickey, 5 Flemming Place, Peterborough, Ont., has the contract for alterations and an addition to the enameling building for the Canadian General Electric Co., Peterborough.

G. Mather, King Street, Preston, Ont., has the general contract for the erection of a one-story factory, 100 x 200 ft., for the Preston Woodworking Machinery Co., Preston.

Wells & Gray, Ltd., 1198 Mercer Street, Walkerville, Ont., has been awarded the contract for a \$12,000 addition to the plant of the Motor Products, Ltd., Walkerville, Ont.

Z. Langlois, engineer, Quebec, is preparing plans for a power house to cost \$60,000 for La Compagnie Electrique de la Sarre, to be built at La Sarre, Que.

The Essex County Sanatorium, Sandwich, Ont., is having plans prepared by Pennington & Boyde, Bartlett Building, Windsor, Ont., for a power house to cost \$40,000.

The Ferguson Contracting Co., 243 Confederation Life Building, Toronto, has been awarded general contract for a \$50,000 addition to the plant of the Skinner Co., Ltd., Gananoque, Ont. The building will be one-story, 60 x 200 ft.

Foreign

THE Government of Finland, Helsingfors, is considering preliminary plans for a chemical wood pulp plant at Veitsiluoto where lumber properties and sawmill and timber plant are in operation under Government direction. The new mill is estimated to cost about 60,000,000 Finnish marks (about \$1,511,350), with machinery, and an appropriation will be arranged in this amount. The American Consulate Helsingfors, George L. Tolman, consul, has information regarding the project.

The Imperial Tobacco Co., London, England, has concluded arrangements for the purchase of a tract of about 25 acres near Salisbury, Southern Rhodesia, South Africa, as a site for a new plant, to cost in excess of \$400,000 with machinery. A power house will be built. Complete mechanical equipment will be installed in the plant, including air conditioning apparatus, conveying machinery, etc. The new factory will be operated in conjunction with the present plant of the company at Limbe, Nyassaland, South Africa.

The Manila Gas Co., Manila, P. I., operating artificial gas properties, has arranged for a bond issue of \$2,250,000, a portion of the proceeds to be used for extensions and improvements, including additional equipment.

The Timken Roller Bearing Co., Canton, Ohio, has acquired a controlling interest in the British Timken, Ltd., with plant at Birmingham, England, and will take over the management with M. B. U. Dewar, London, England, who has secured an interest in the company. An expansion program will be carried out, including enlargement of the Birmingham plant and installation of additional equipment; this work will be placed under way at once. The company is also completing plans for the establishment of branch plants in France and Germany.

Plans are said to be under way for the construction of a new electric power plant at Orel, Russia, to cost close to \$850,000 with equipment. The project will include a transmission line. A similar project is also under consideration on the Poporovan River, in the Georgia district of Russia, to develop an initial output of 70,000 hp., reported to cost more than \$1,250,000 with transmission system. The American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York, has information regarding the enterprises.

